ORIGINS

The Journal of The Biblical Creation Society

No.24

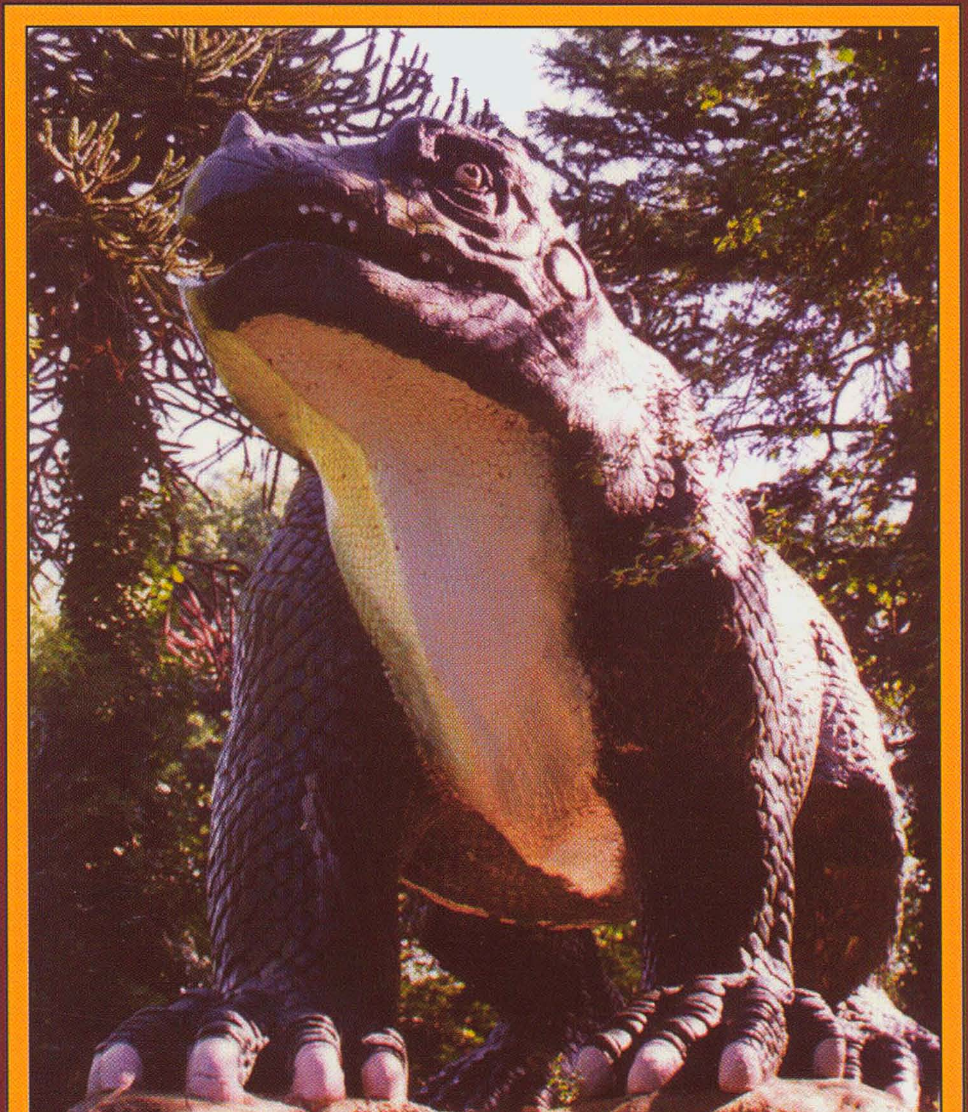
February
1998

Why don't WE Live to be 900?

Jupiter's Puzzling Moons

The First Great Catastrophe

Genesis, the New Testament & Historicity



The *Real* Lifestyle of the Dinosaurs

£2·75

ORIGINS
• Journal of the Biblical Creation Society •

No. 24
February 1998

Contents

		Page
Editorial	J. H. John Peet	**1**
The Biblical Ages of the Patriarchs	Richard H. Johnston	**2**
Genesis, the New Testament and Historicity	Philip P. Duce	**10**
The Real Lifestyle of the Dinosaurs	Michael Garton	**14**
Correspondence		**22**
The First Great Catastrophe	J. H. John Peet	**23**
News of Creation		**27**
Reviews		
Darwin's Black Box	J. H. John Peet	**30**
And God Said ...	Paul Garner	**31**
Some Questions to Ponder		**32**
Queries and Comments		**33**

COVER PHOTOGRAPH

An Iguanodon reconstructed from fossilised bones for the Great Exhibition of 1851 and now to be seen at Crystal Palace. (Photograph by Michael Garton.)

Writing for Origins

Origins is looking for talented new writers, particularly those who have had experience in a specialised field of science or theology, in relation to creation, and who are in agreement with the aims and basis of the BCS. In addition, writers in a popular vein are needed, but accuracy and solid content are still essential. Any manuscripts for consideration should ideally be typed, double-spaced and sent to the Editor. Notes of guidance to authors are available on request. News items that may be of interest are also sought. We now welcome articles on disk in most formats, but 3½ ″ HD, Wordperfect 5.1 or ASCII preferred; media will be returned after transfer of the file.

Editorial Policy

Whilst **Origins** exists to further the aims of the Biblical Creation Society, opinions expressed in articles and signed editorials are not necessarily shared by either the Editorial Committee or the Society.

The Biblical Creation Society grants permission to the readers of **Origins** to photocopy material for the purposes of personal study or research. Material is copyright and permission must be sought from the editors to reproduce material for other purposes.

Editorial Committee

General Editors
J. H. John Peet, BSc MSc PhD CChem FRSC
Peter Senior, BSc CPhys MInstP
Paul Garner, BSc

Consultant Editor
David C. Watts, BSc PhD CPhys FInstP CChem FRSC

Review Editor Paul Garner, BSc

Advertising Editor Peter Senior, BSc CPhys MInstP

Designed and set by
Langlands Edition.
Telephone: (01509) 235659

Editorial

WE are often asked about the relationship between the various creationist groups in the U.K. The *BCS* committee felt it would be helpful to outline the situation as we understand it. There is a general sense of cooperation between us, rather than competition, each group operating in a particularly limited sphere. Several *BCS* members, for example, speak for other groups by invitation.

The oldest creationist group in the U.K. (and in the world, founded in 1932) is the one now known as the *Creation Science Movement.* We salute this organisation for its long stand against evolutionary theory. This movement still publishes a lot of material with the non-specialist in mind, Paul Garner (one of our editorial committee) having contributed three of these. They also produce a regular newssheet, *Creation.* David Rosevear is the chairman of the Council and 'public face' of the *CSM* and has a full speaking programme. More recently they have been building an exhibition centre in Portsmouth ('Genesis Expo') which is due to open in the near future. The society can be contacted at 50 Brecon Avenue, Portsmouth, PO6 2AW.

The *Biblical Creation Society* is now 21 years old. It differs from *CSM* in its specific objectives, though, of course, our general aim is the same. Our objectives can be summarised as:

- advancing and defending the biblical account of creation
- researching for a coherent biblical and scientific viewpoint
- challenging fellow Christians who have accepted holistic evolutionary views.

As readers will know, our main publication is this journal. We try (not always successfully!) to present new research in a form intelligible to the non-specialist. As funds permit, we would like to produce a new range of popular leaflets (the former booklets being out of print and in need of revision). We hope that our *Creation Manifesto* will be a publication that can be a basis of unity between the different organisations in the world. We have a number of projects in mind, but all depend on financial support. Aside from our travelling secretary, John Peet, we have several men and women that are available for speaking at meetings.

A younger organisation which is becoming increasingly well-known through its Creation Discovery Days™ is the *Creation Resources Trust.* Geoff Chapman is their organiser, operating from Mead Farm, Downhead, West Camel, Yeovil, Somerset, BA22 7RQ. Geoff's meetings are aimed at the adult and teenager population, but his best-known publication is probably '*Our World*,' an illustrated leaflet for children distributed around the world.

Perhaps the best publicized movement in the U.K. is the *Creation Science Foundation* (also known as *Answers in Genesis*), an Australian organisation which has established an office here (PO Box 1427, Sevenhampton, Swindon, SN6 7UF). They are well-known through their main speaker, Ken Ham, who has a fast-speaking, popular delivery which has convinced many people of the validity of the creationist message. They have a popular magazine, *Creation Ex Nihilo*, which makes an attractive 'coffee table' presentation. Their technical journal is the *Creation Ex Nihilo Technical Journal* which has a similar objective to our *Origins* but is much larger and generally more technical.

The Genesis Agendum is a very new organisation (12 Mountbatten Road, Oakham, Rutland, LE15 6LS) which has been formed for a limited objective; to establish an exhibition centre in London to demonstrate the accuracy of the Bible through historic and scientific scholarship.

There are, of course, many other people working to the same end as these groups, whether in regional organisations, church-based ministries or specialist projects. This editorial merely draws attention to the 'larger' bodies. We are happy to commend these workers to you for prayer support, that we may, together, present the truth as revealed in Scripture.

J.H.J.P.

The Biblical Ages of the Patriarchs

A record of events permanently damaging to human life expectancy

Richard H. Johnston

THE BIBLE testifies to large, systematic, and irreversible reductions in human life expectancy during the period between the Fall and the time of the Exodus and the Israelites' refusal two years later to enter the Promised Land. After Israel entered the Promised Land, however, normal human life expectancy did not change further, but became stable at about 70 to 80 years, just as it is today.

Improvements in public health in developed countries over the last two centuries have, of course, led to a recent dramatic increase in the *average* life expectancy at birth. This is mainly because fewer people now die in childhood of infectious diseases and from the effect of poor diet. Nevertheless, even in the absence of disease, everybody ages, resulting in long term decline and eventual death. Typically people die from this ageing process when they are about 70, though some people have sufficient strength to live longer (Psalm 90:10). This *maximum* life expectancy—*i.e.* the lifetime achieved in the absence of sickness or accident—may be termed the *normal* human life expectancy. Unlike the *average* life expectancy at birth, *normal* life expectancy, which is the concern of this paper, has not changed significantly in recent centuries. Indeed, Jesus suggests that normal human life expectancy cannot be extended by anything man can do (Matthew 6:27)!

Wieland (1994) suggested that the fall in normal life expectancy after the Flood could simply have been the result of genetic drift, but the scale and suddenness of some of the changes seem too large for this to be the whole story. Environmental factors, therefore, seem likely to have played a role, though Wieland was undoubtedly right to seek an explanation with genetic implications because the reductions in life expectancy were permanent and there is no evidence that normal animal life expectancy can be extended in experimental laboratory environments. A more fundamental difficulty with Wieland's suggestion, however, is that it is incapable of providing a biblical reason for the decline. Having your lifespan halved is a very important thing to happen to anyone—and, biblically, highly significant! This paper therefore seeks an explanation in terms of the general structural principles concerning God's dealings with sinful man.

Normal human life expectancy first became just short of 1,000 years as a result of the Fall. The changes in life expectancy from over 900 years in the period before Noah's Flood to its present value (achieved by the time of the children of Israel's entry to the Promised Land) was not the result of some steady long-term decline. For the most part it fell suddenly and considerably on three further specific occasions which Scripture records: Noah's Flood, the time of the birth of Peleg, and during the Exodus. These sudden falls in life expectancy are each associated in Scripture with a judgment, itself the consequence of human sin.

In addition to these three very clear 'step-change' reductions, there was a period of 150 years of uneven decline, when average life expectancy was falling, but some people still had quite long lives while others had much shorter lives. This period started with the death of Peleg and was complete by the birth of Jacob. Apart from the link through Peleg back to the judgment at Babel, the decline is otherwise not obviously connected with a specific judgment, though judgments such as that of Sodom and Gomorrah took place during the period.

Since Scripture does not indicate any 'miraculous' reductions, these changes in life expectancy were probably mediated through 'natural causes' during periods when the quality of the Earth's environment was damaging to life. Isaiah 24:1–6 and Revelation imply that judgments on sin powerful enough to reduce human life expectancy would have been associated with damage to the quality of the Earth's environment. It seems likely that the main events would have been large enough to have left their mark in the geological record: also, whenever human life expectancy was reduced, some animals and plants possibly became extinct. This paper does not examine such correlations, but is confined to the Scriptural record on life expectancy.

The Scriptural Data

The ages and implied dates given in the Hebrew Bible have been used: they are laid out for convenience in Table 1, together with the supporting evidence. The details of the calculations used to create the chronology are also given in Table 1 and its footnotes: they are not repeated in the main text. The chronology agrees with that given by Martin Anstey (1913), which this author re-checked for the period down to Israel's entry to the Promised Land.

For the period of the Patriarchs down to Jacob, the dates of their births and deaths from the beginning of the world can be easily determined, and are without controversy amongst biblical chronologers. Later dates present more difficulties, but after careful analysis, any uncertainties about the dates down to the time of Israel's entry into the Promised Land can extend a few years each way at the

Life Expectancy	**Name**	**Born**	**Age when son born**	**Died**	**Age at death**	**Reference** *etc.*
Between 900 and 1,000 years	Adam	0	130	930	930	Gen 5:3–5
			Fall, murder of Abel			Gen 3; 4:8
	Seth	130	105	1042	912	Gen 5:3–8
	Enosh	235	90	1140	905	Gen 5:6–11
	Kenan	325	70	1235	910	Gen 5:9–14
	Mahalaleel	395	65	1290	895	Gen 5:12–17
	Jared	460	162	1422	962	Gen 5:15–20
	Enoch	622	65	987	365	Gen 5:18–24 (Taken by God)
	Methuselah	687	187	1656	969	Gen 5:22–27
	Lamech	874	182	1651	777	Gen 5:26–31 (Died 5 years before Flood)
	Noah	1056	502	2006	950	Gen 5:29–32; 7:6; 9:28–29; 11:10
		1536	*Promise of judgment as a result of sin*			Gen 6:1–4
	Shem	1558	100	2158	600	Gen 5:32; 11:10–11
		1656	*Flood starts*			Gen 7:6
About 440 years	Arphaxad	1658	35	2096	438	Gen 11:10–13
	Salah	1693	30	2126	433	Gen 11:12–15
	Eber	1723	34	2187	464	Gen 11:14–17
About 235 years	Peleg	1757	30	1996	239	Gen 11:16–19
		1757–1996	*Division of Earth: during days of Peleg*			Gen 10:25
	Reu	1787	32	2026	239	Gen 11:18–21
	Serug	1819	30	2049	230	Gen 11:20–23
Falls unevenly from 235 to 135 years	Nahor	1849	29	1997	148	Gen 11:22–25
	Terah	1878	130	2083	205	Gen 11:24–27,32
	Abraham	2008	100	2183	175	See Note 1. Gen 17:24; 21:5; 25:7–8
		2083	*Call of Abraham: Abraham aged 75*			Gen 12:4
		2107	*Destruction of Sodom and Gomorrah*			Gen 18–19
	Sarah	2018	90	2145	127	Gen 17:17;23:1–2
	Ishmael	2094		2231	137	Gen 16:16; 17:25; 25:17
	Isaac	2108	60	2288	180	Gen 21:5; 25:26; 35:28
About 135 years	Jacob	2168	91	2315	147	Gen 25:26. See Note 2. Gen 47:28
	Joseph	2259		2369	110	See Note 2. Gen 50:26.
	Levi	(2255)		(2392)	137	See Note 3. Ex 6:16
	Kohath	[2295]		[2428]	133	See Note 4. Ex 6:18
		2298	*Children of Israel move to Egypt*			(See Note 2)
	Amram	[2365]		[2502]	137	See Note 5. Ex 6:20
Affected by Exodus. Falls from 135 to 70–80 years	Moses	2433		2553	120	See Note 6. Deut 34:7
	Aaron	2430		2553	123	Ex 7:7. Num 33:39
	Joshua	[2475]		[2585]	110	See Note 7. Josh 24:29
	Caleb	2475			>85	Josh 14:7,10
		2513	*The Exodus*			Ex 7:7
		2514	*Israelites refuse to enter Promised Land*			All adult Israelites who refused to enter promised land in 2514 die before 2553 A.M. (lives therefore very short compared with previous generations)
		2553	*Entry to Promised Land*			
	Some later people with recorded ages					
70–80 years	Eli	2905		3003	98	See Note 8. I Sam 4:15ff. Old and blind
	David	3032		3102	70	2 Sam 5:4
	Barzillai	[3000]			>80	2 Sam 19:32. 'Very old, being 80 years'
	Jehoiada			[3250]	130	2 Chr 24:15. 'Old and satisfied with days'

All dates are Anno Mundi (A.M.)
Dates in parentheses are approximate. Dates in square brackets are estimates.
Significant Bible events are in italics.

Table 1: The Dates and Ages of the Patriarchs

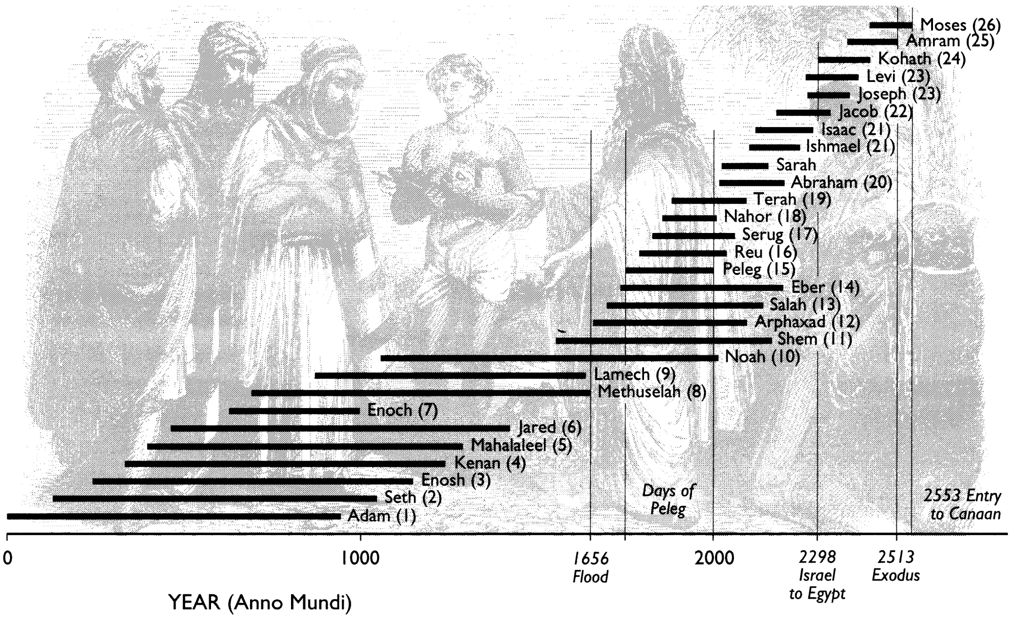


Figure 1: The Ages of the Biblical Patriarchs (The numbers in brackets after the names indicate the generation from Adam.)

most. The ages achieved by individuals are not subject to uncertainty. All the significant changes in human life expectancy took place within this period.

Is the Hebrew Bible data what it appears?

Doubt is sometimes cast upon the ages in the Hebrew Bible because the Septuagint and other early versions give different ages for some of the Patriarchs. Martin Anstey (1913) considered this question in detail. He showed that the Hebrew Bible had all the hallmarks of authenticity. By contrast, there was clear evidence of arbitrary adjustment in the Septuagint chronology: the changes in life expectancy had been smoothed out to make them appear more plausible, and the timescale had been extended. Anstey concluded that those alternative dates and ages are entirely unreliable: the data was adjusted by the Septuagint translators to accommodate the then contemporary secular chronological theories. There is nothing new under the sun! The accommodation of millennial theories was a further factor leading to adjustments in this version: this accounts for the insertion, between Arphaxad and Salah, of the name Cainan (whose name is taken from Genesis 5:9) in the Septuagint (from which Luke 3:36 was apparently copied). This Cainan appears in no other ancient version.

It is sometimes suggested, normally for reasons of comparative chronology unconnected with the sacred record, that the patriarchal chronology is incomplete, with the inference that the total elapsed time is therefore capable of arbitrary extension. However, the way the ages and periods of time are given in the Hebrew Bible precludes this inference, at least for the period from the Creation to the Exodus which is the subject of this paper. Moreover, Jude testifies to the completeness of the genealogical record down to Enoch (Jude 14).

For the period from Adam to Terah, covered by the genealogies in Genesis 5 and Genesis 11, the age of the father when the son is born is given explicitly, which allows the relevant dates to be determined. Even if it were the case that the 'son' were actually a grandson, the true son's name having been omitted, it would still remain true that the grandson was born when the father was the age given in the text. If it were not the intention of the text to permit such computations, the level of chronological detail provided would be pointless. This subject has been dealt with academic thoroughness by Prof. Dr. Samuel R. Kuelling (1996).

From Terah to the Exodus, the situation is more complex, but the important dates in the chronology can be calculated (see Anstey (1913) p.113–125). The total duration of this period is bounded by such durations as the 400 years of Genesis 15:13, and the 430 years of Exodus 12:40. The plausibility of the dates, ages at son's birth, *etc.* of Levi's descendants (Exodus 6:16–26) obtained from calculations based on Genesis 15:13, combined with the statement that the children of Israel would return to the Promised Land in the fourth generation (Genesis 15:16), confirms that the effect of any errors in the assumptions underlying these deductions must be insignificant. It should be noted, in particular, that fulfilment of Genesis 15:16 is just possible if the children of Israel were in Egypt for 215 years, but impossible if they were there for 400 years.

It is concluded that the Hebrew Bible genealogies are authentic, that chronological data derived from them remains reliable even if the genealogies were incomplete, and that any errors in the dates used in this paper cannot be large enough to alter its conclusions. Even if there were 'time gaps' in the Genesis genealogical record (which this author does not believe), the main conclusion of this paper, that human life span fell in a systematic way which can be correlated with biblically significant events, would remain valid.

The Stages in Reduction in Life Expectancy

The implications for life expectancy of the chronology of Table 1 will now be explored in chronological order.

The Fall and Abel's murder

Adam was created with the potential to live for ever, but by this one man's sin, death entered the world (Romans 5:12). This event is responsible for the reduction of the pre-Flood patriarch's life expectancy to just under 1,000 years. This affected Adam as well as his descendants. There were undoubtedly associated changes in the physical environment (see Genesis 3:18,24), and further changes as a result of Abel's murder (see Genesis 4:12). The evidence of death and of 'thorns and thistles' remain in the environment as a testimony to these judgments.

The Fall to the Flood

From the Fall to the Flood the normal life span was constant at somewhat over 900 years. Apart from Enoch (who did not die as such, but was translated at age 365 years) and Lamech, who died age 777 just five years before the Flood, and who may therefore have been deliberately spared by God from this judgment, all the pre-Flood patriarchs lived to around 900 years or more. There is no downward trend in their achieved ages. Environmental conditions were therefore presumably stable during this period.

The consequences of the Flood and its immediate aftermath

Noah's Flood was a world scale catastrophe of unimaginable severity, which reduced life expectancy of those born after the Flood to less than half its previous level.

Noah's life span was not affected by the Flood—he lived 350 years after the Flood (which took place in 1656 Anno Mundi (A.M.)), to die at 950 (in 2006 A.M.). This implies that any damaging environmental impacts during the life time of Noah did not affect anyone already alive at the time of the Flood.

Unlike Noah, Shem's life span does appear to have been reduced at some stage—his life span was reduced to 600 years (he died 2158 A.M.). It would seem that although the Flood did not affect Shem, events between the time of Noah's death and that of Shem did reduce life expectancy, including that of anyone born before the Flood. This conclusion must be tentative, since apart from Noah, Shem is the only survivor of the Flood whose age at death is given in Scripture. It will be seen below, however, that there is corroborating evidence from later generations that life spans of those already alive were being reduced during the latter part of Shem's life.

The three generations who were born during the first 70 years after the Flood had a life expectancy of about 440 years, a little less than half that of the Pre-Flood patriarchs, *viz.* Arphaxad (1658–2096, aged 438), Salah (1693–2126, aged 433, and Eber (1723–2187 aged 464). The consistency of the ages of these *three* men suggests that this was at that time the normal human life expectancy. (The Bible regards a threefold witness as a certainty.) Shem outlived both Arphaxad and Salah, so we conclude that these three men were born with a drastically reduced life 'strength,' to use the Psalmist's word (Psalm 90:10). This suggests that the Flood and at most the two years which followed (1656–1658) had a very damaging effect on the human reproductive cells, but did *not* affect other human cells enough to cause a reduction in life expectancy of those already alive. Moreover the reduction in life expectancy caused to Arphaxad as a result of the Flood was *permanent and transmitted to his descendants,* since Arphaxad's son and grandson lived about the same length of time. Environmental mechanisms for this are a matter of speculation, but nuclear radiation or chemical pollution seem likely candidates, and raise interesting questions about whether the Ark was designed to minimise these effects.

The days of Peleg

Scripture tells us (Genesis 10:25) that in the days of Peleg (1757–1996) the earth was divided. Some people claim that this only refers to the separation of the peoples which took place following the construction of the Tower of Babel (Genesis 11:1–9), but Genesis 10:25 speaks of the 'earth,' a word used biblically of the 'ground' and not of 'peoples,' so it is more reasonable to conclude that it refers to the division of the physical earth. The principles of Isaiah 24, that man's sin leads to consequential impacts on the environment as a result of Divine judgment, confirm that it is probable that the physical earth was physically divided, to ensure the permanence of the separation which God declared at Babel. Indeed, it is difficult to see how God could have ensured the *permanence* of the Babel scattering any other way.

This surmise is strengthened and confirmed by consideration of the impact during the era of Peleg on human life expectancy, which again fell suddenly by about half from 440 years to about 240 years, beginning with Peleg himself, again without any subsequent recovery, followed by a slower and more irregular decline to 135 years during the 150 years which followed Peleg's death.

The initial sharp drop, followed by a period of stability is evidenced once again by the witness of *three* generations, *viz.* Peleg (1757–1996, aged 239), Reu (1787–2026, aged 239), and Serug (1819–2049, aged 230). As with the previous three generations the consistency of their achieved ages is very striking. The lack of a biblical explanation makes a 'miraculous' cause unlikely. Amazingly, they all died over 100 years before Shem, and they all died long before the death of any of the three previous generations. This suggests an environmental event immediately prior to the birth of Peleg which was permanently damaging to reproductive cells, but again had little impact on those already living. It seems reasonable, in the light of Genesis 10:25, to identify this event with the start of the physical division of the earth, consequent on the sin of Babel (Genesis 11:1–9) and the consequent separation of the nations (Genesis 10:32). This initial event took place almost exactly 100 years after the Flood, and according to Genesis 10:25 the process of separation took a maximum of 240 years to complete.

The decline from Peleg to Jacob

After Serug (1819–2049), trends in life expectancy for the next 150 years are clearly downwards, but the details are harder to determine, and the nature and causes of this decline should be viewed more tentatively than the clear-cut 'step-change' falls previously considered, which were explicitly associated with divine judgments. The overall result however was a fall from the 235 years during the previous period to the 135 years during the period from Jacob to the Exodus.

This change away from a clear pattern is not altogether unexpected in view of what God had done. He had successfully scattered the human race, so that there was no longer a single culture. God could now deal with the scattered individuals and family/national groups much more on their own merits (*cf.* the judgment of the Amorites, Genesis 15:16). God now probably made greater use of war, famine and disease as His means of judgment, though fatal sickness is not recorded until Genesis 48:1. Although 'every intent of the thoughts of man's heart was only evil continually' (Genesis 6:5), each culture would have become ripe for judgment at a different time (Genesis 15:16). The pace of judgment, and its manifestation in falling life expectancy was consequently probably more varied.

Nevertheless the biblical record of the fall during this period in life expectancy from 235 years to 135 years cannot be ignored, nor can the fact that, for people living in comparable circumstances, normal life expectancy today does not vary greatly or systematically between the different races. This suggests that whatever the factors were that reduced life expectancy, they eventually had much the same effect on every racial group. Divine judgments on human sin, such as the destruction of Sodom and Gomorrah (Genesis 19:1–29) which took place during this period, may well have had some general impact on everyone. However the direct connection between divine judgment and the fall in life expectancy during this period is much more tenuous than in the earlier period. Moreover, the biblical records of life span are confined to the 'line of promise' and those closely associated with them: it is possible that the key people in this line may have lived longer than people in general. There is perhaps some supporting evidence (Genesis 15:15) for this in the case of Abraham.

The main technical difficulty in tracing the progress of the decline is the lack of data: the series of regular births every 30 years or so concludes with Terah (b. 1878). This may itself be significant, if an environmentally difficult period had a temporarily adverse effect on fertility. Genesis records Abraham, Isaac and Jacob as all experiencing fertility problems, but this was not, apparently, a problem for their descendants (Exodus 1:7,9,12).

In addition, the recorded ages at death now become proportionately much more variable, to an extent that may even suggest two 'statistical populations.' Although there is a reduction in everybody's life expectancy after Serug, some people continue to have relatively long lives (Terah 205, Abraham, 175, Isaac 180), while others, broadly contemporary, have significantly shorter lives (Nahor 148, Sarah 127, Ishmael 137). This pattern persists until about the time of Jacob (2168–2315) by which time life expectancy has become stable for everyone at this lower level of about 135 years, and then continues at this level, again stated explicitly for *three* generations (Exodus 6:16,18,20), while the Israelites were in Egypt, until the Exodus.

The fall in life expectancy immediately after Serug, following the three generations of stability, suggests that there was a significant event damaging to human life expectancy at about the time of the death of Peleg in 1996 A.M. The first casualty was Serug's son Nahor (1849–1997), the grandfather of Abraham, who died at the then extremely early age of 148, the year after the death of Peleg (which a straightforward reading of Genesis 10:25 would suggest marked the end of the era of the separation of the continents).

Nahor's son Terah (1878–2083, aged 205) is the last person recorded as living more than 200 years. Terah not only concludes the regular sequence of records of births taking place roughly every 30 years, which started with Arphaxad, but also probably concludes a sequence of five generations born with an *initial* 'life-strength' of about 240 years.

The shorter lifetimes achieved by Nahor, Terah and their immediate descendants, and the wider variation in their lifetimes, seem likely to be the result of environmental conditions which affected the life expectancy of those already living rather than affecting only the life expectancy of the new-born as had been the case previously. This also ties in well with the timing of the reduction in the life span of Shem (died 2158 A.M.) noted earlier. Sickness leading to premature death may have been a factor, although sickness is not recorded in Scripture until the death of Jacob (Genesis 48:1).

The process of reducing human life expectancy from about 235 years to 135 years took place over a more extended period than the earlier events. This took at most 150 years, but probably less, from about 2000 A.M., after the death of Peleg, to about 2150 A.M. (at the latest), about the time when Jacob was born. Following the event about the time of Peleg's death, the environment must have continued to be damaging for a significant period thereafter. This may have been due to the effects of the residues of the event at the time of Peleg's death, or perhaps a series of smaller scale events continued after the death of Peleg. The Scriptures certainly record famines during this period (Genesis 12:10; 26:1) (and famines can be caused by major eruptions, for example) not to mention the environmentally damaging judgment of Sodom and Gommorah (Genesis

19:24–28). Whatever the causes, it is clear that not everyone's life expectancy was affected at the same time but by the end of the period it had fallen to about 135 years for everyone.

Unfortunately the lack of detailed life expectancy information for anyone born between the birth of Terah (1878) and Abraham (2008), a period of 130 years, makes it impossible to be more specific about the length of this period of life reduction. However, the elder of Abraham's brothers, Nahor or Haran, was born in 1948 A.M. Genesis 11:28 records that Haran died before Terah, hence before 2083, so he was at most 140 years when he died (and probably much less, since Haran died while Terah still lived in Ur).

Abraham (2008–2183, aged 175), and Isaac (2108–2288, aged 180) are the last people recorded as living beyond 150 years, but their long lives were already beginning to look exceptional (Genesis 15:15). It would therefore seem that the bulk of the reduction in lifetimes took place in the years immediately following the death of Peleg. Sarah (2018–2145, aged 127), and Ishmael (2094–2231, aged 137) have the shorter lifetimes which became characteristic of those who lived during the period from Jacob to the Exodus.

Unlike the earlier periods, the underlying cause of the reduction in lifetime cannot be determined unambiguously. It seems most likely to have been mainly due to the final outworking of the Babel judgment which divided not only the nations but the land itself. But significant environmental events are recorded by the Bible as taking place during the lifetime of Abraham. The destruction of Sodom was certainly God's direct judgment on man's sin, and it is possible that the earliest famines (Genesis 12:10) were related to the iniquities of the Amorites (Genesis 15:16) and others then living in the land of promise. These events may therefore have played a subsidiary role.

From Jacob to the Exodus

The Period from Jacob to the Exodus marked a further period of stability in life expectancy. The four generations from Jacob to Levi's grandson Amram are (Exodus 6:16–20): Jacob (2168–2315, aged 147), Joseph (2259–2369, aged 110), Jacob's son, Levi (born about 2255 A.M., died aged 137), Levi's son, Kohath (born before 2295 A.M., died aged 133), and Kohath's son, Amram (aged 137). For this group the normal life expectancy was about 135 years.

Although this was a stable period for life expectancy, 'Joseph's' Famine which took place within the period was of wide extent and long duration and so probably corresponds to a global environmental event, though not, apparently, one affecting normal life expectancy.

The Exodus and Israel's refusal to enter the Promised Land

The next generation after Amram was affected by the Exodus, and by the judgment on Israel which followed their refusal to enter the Promised Land. The lives of Amram's sons Moses (aged 120) and Aaron (aged 123) were amongst those whose lives were limited by the consequences of Israel's rebellion and unbelief (Psalm 95 and Hebrews 3 & 4). A straightforward reading of Numbers 14:20–35 might suggest that only a single generation of Israelites would be affected by this judgment, so that those who were 20 at the time (Numbers 14:29) were to die no later than at about 60 years old. Nevertheless, as with the previous judgments, much of the reduction in life span at this time appears to have been permanent, and inherited by their descendants, since life expectancy never recovered to 135 years once the people were in the Promised Land. Seventy to eighty years became the norm.

Psalm 90 starts with a header which declares it to be 'A prayer of Moses the man of God,' which its content suggests was composed by him for the benefit of the people following God's judgment on Israel when they refused to enter the Promised Land. It gives insight into the reduction of life span to 70 to 80 years, and his prayer may be the reason why, although God has had to exercise many judgments since, this has remained the normal life span across the world down to this day. Psalm 90:7–12 reads (NASB):

> '[7] For we have been consumed by Thine anger,
> And by Thy wrath we have been dismayed.
> [8] Thou hast placed our iniquities before Thee,
> Our secret sins in the light of Thy presence.
> [9] For all our days have declined in Thy fury;
> We have finished our years like a sigh.
> [10] As for the days of our life, they contain seventy years,
> Or if due to strength, eighty years,
> Yet their pride is *but* labour and sorrow;
> For soon it is gone and we fly away.
> [11] Who understands the power of Thine anger,
> And Thy fury, according to the fear that is due Thee?
> [12] So teach us to number our days,
> That we may present to Thee a heart of wisdom.'

Verses 7–9 refer to God's judgment on life span because of sin, and a consequent decline in life span (v.9), and seems to refer back to the refusal of Israel to enter the Promised Land. Verse 10 declares what seems to be the new normal life span: 'As for the days of our life, they contain seventy years, or if due to strength, eighty years,' which is what it has continued to be until this day. If this is the case then the last reduction in life span can be pinpointed to this time and the period of Israel's wanderings in the wilderness. If God used mediate means, the then unusually short lifetimes of the wanderers may indicate that some life-damaging environmental event took place during the period of Israel's wanderings in the wilderness.

After the entry into the Promised Land the Bible record shows that life expectancy was much as it is today. Joshua died aged 110, not an impossible life span even today. (His long life and that of Caleb, which exceeded 85 years, were, of course, entirely exceptional for their generation). Later, Eli seems to have been exceptionally old when he died at age 98 'old and blind' (1 Samuel 4:15), while King David (born about 3032 A.M.) died at the normative age of 70 (2 Samuel 5:4). The last person in the Bible whose life is recorded as exceeding 100 years, is Jehoiada, whose wife rescued king Joash. He died aged 130 years (2 Chronicles 24:15): his exceptionally long life was a manifestation of God's grace to Judah, since after his death king Joash turned away from the LORD.

Jehoiada apart, the life spans recorded after Joshua are generally similar to those today, and the absence of exceptionally long periods of office as Judges or Kings confirms that the reduction in life expectancy from 135 years down to 70 years was permanent, and took place at around the time of the judgment on Egypt (2513 A.M. = 857 years after the Flood) or, more probably, followed the refusal of Israel to enter the promised land in (2514 A.M.), during the period of the Israelite wandering in the wilderness which ended in 2553 A.M. just short of 900 years after the Flood.

The Exodus and the period of the Israelite wanderings in the wilderness involved a number of miracles of judgment, which could have been associated with events which may have been environmentally significant, and which may have left a mark on the geological record. The environmental and physical judgments on Pharaoh and Egypt were corporate judgments from God. Although their direct impact was limited to the land of Egypt, some, though certainly not all, were probably brought about by 'natural' events: these may have had wider environmental effects. The crossing of the Red Sea (Exodus 14:21–29) certainly involved God-caused 'natural' phenomena, and looked suspiciously like an event on at least a regional scale: quite apart from the strong wind (Exodus 14:21), that was probably cold (Exodus 15:8), Psalm 114 associates the event with earthquakes and, probably, mountain-building. Some of the miracles while Israel was in the wilderness probably involved geological events (*e.g.* Numbers 16:31–33).

Of course, the biblical life span record for this period is confined to the people of Israel, and it is possible that the rate and timing of the decline in life expectancy of other ethnic groups to the present level may have differed. Nevertheless, Israel has a special place in God's economy, and through them all the nations will be blessed (Genesis 12:3), or otherwise, and this blessing or cursing partly corresponds to the measure of obedience of His own special people. Moreover the Egyptians were representative of the world as a whole in their attitude to the Israelites. If major environmental causes were responsible for the reduction in life expectancy, which seems almost certain, they probably affected all nations to much the same extent at much the same time. Since the fall in life expectancy from 135 years to 70–80 years occurred at such a pivotal, and rebellious, phase of Israel's history, it seems reasonable to conclude that the reduction in normal life span to the same level for all races across the world was probably closely related to the obedience of the people of Israel. Such a connection is offensive to the Gentiles, but is consistent with Biblical principles.

Conclusions

The Hebrew Bible genealogies are authentic and chronological data derived from them remains reliable, even if the genealogies are incomplete. Any errors in the dates used in this paper are not large enough to alter its conclusions.

Human life expectancy fell suddenly on a number of specific occasions between the Flood and Israel's entry to the Promised Land. Moses' prayer (Psalm 90) appears responsible for the stability of normal human life expectancy for all nations since then. That normal life expectancy has not changed for over 3,000 years makes it unsurprising that men now believe that all things have continued as they were from the beginning of Creation.

The series of largely 'step-change' reductions in the ages of the patriarchs suggest a series of events which were permanently damaging to the life expectancy of human beings and which were associated with specific acts of God's judgment on men. Between the events there were periods when life expectancy remained constant. It seems probable that the mediate causes of these reductions in life expectancy were environmentally significant events which may have left their mark in the geological record.

Even if there were time gaps in the scriptural record, as some people claim, it remains true that systematic reductions in human life expectancy, associated with specific occasions of Divine judgment, took place in the period from Noah's Flood to Israel's entry into the Promised Land (a period of some 900 years according to Biblical chronology), and that these life span reductions may correspond to events in the geological record.

In summary the events that reduced human life expectancy were as follows:

a. *The Fall and, soon afterwards, the murder of Abel.* Some environmental changes took place and death entered the world. (Life expectancy was reduced from immortality to less than 1,000 years, affecting those already alive as well as the newly born. The new life expectancy was in excess of 900 years).
b. *Noah's Flood.* (Life expectancy reduced from over 900 years to about 440 years) 1656 A.M. God's judgment destroyed the ancient world and its inhabitants. The reduction in life expectancy only affected the new born.
c. *An event at about the time of the birth of Peleg,* coinciding biblically with the start of the break-up of the earth (life-expectancy reduced from 440 years to 240 years) 1757 A.M. (100 years after the Flood). This was a judgment consequent upon the Tower of Babel (Genesis 11:1–9). This also affected only the life expectancy of the new born.
d. *An event at about the time of the death of Peleg* (1996 A.M., 340 years after the Flood), coinciding biblically with the end of the break-up of the earth, followed by an era of damaging environmental conditions, which were either consequent upon the event at the end of Peleg's life, or perhaps the result of a series of further events. This period lasted from the end of Peleg's life for

a period of at most 150 years (2000—2150 A.M.), until about the time that Jacob was born. This period did not have enough people born in it whose details are recorded in Scripture for it to be possible to decide if there were separate life-reducing events or a steady decline. During this period life expectancy fell from about 240 years to 135 years. Unlike the two previous events, this affected those already alive as well as the newly born, initially producing a wide variation between individuals in their life expectancy. This might suggest that premature death through disease may have become more of a problem, though no reference is made to fatal disease in Scripture until the death of Jacob (Genesis 48:1). During this period and into the period of stable life expectancy which followed this reduction, famines (perhaps a judgment on the sins of the nations (Genesis 15:16)), some of which were on a world scale over several years (Joseph's), are reported for the first time. Also Sodom was destroyed by God's direct action from heaven because of its sin.

e. *At about the time of the Exodus* (2513 A.M.) and the refusal of Israel to enter the Promised Land (2514 A.M.) the final reduction from 135 to 70–80 years took place. The reduction was complete by the end of the Israelite wanderings in the wilderness (2513–2553 A.M.). It was sufficient to ensure the then very premature death of all the rebellious Israelites in the wilderness by 2553 A.M., almost exactly 900 years after the Flood. This reduction affected those already living rather more than the newly born, though there was undoubtedly a permanent reduction in life span at that time to its current value. This is confirmed by Psalm 90:10 which is a prayer of Moses, apparently written in response to God's judgment on the Israelite rebels. There is relatively little age specific information in the rest of Scripture, but what information there is during the period of the Judges and Kings confirms that normal life expectancy never recovered to the pre-Exodus levels.

It may be concluded that the ages of the patriarchs show a pattern of decline consistent with their life expectancy being reduced as a result of a series of geophysical or cosmic events, with periods of normality between them. These events seem to have produced an environment temporarily damaging to life: the newly born had a lower life expectancy as a result which was inherited by their descendants. The later events also reduced life expectancy of those already alive. Leaving aside the Fall, the first reduction in life expectancy took place as a result of Noah's Flood in 1656 A.M. and the last reduction in life expectancy was completed about 900 years later at the time that the children of Israel finally entered the Promised Land.

Although after the Babel scattering God was able to deal with nations and people on a more individual basis, through war, famine and pestilence, the present consistency of normal life expectancy across the world suggests world wide environmental events continued to be responsible for reductions in life expectancy after Babel. The last of these reductions at the time of the Exodus, and Moses prophecy that there would be no further falls, seems to give the children of Israel a central role in the present uniformity of life expectancy.

It seems plausible to suggest that these changes in life expectancy may correspond to identifiable events in the geological record (perhaps especially in the form of mass extinction events). As the last reduction in life expectancy took place some 900 years after Noah's Flood, the period of significant geological upheaval following Noah's Flood may therefore have been very much longer, and on a greater scale, than has been normally assumed by creationists hitherto.

Notes

1. *Birth of Abram.* Genesis 11:26 says Terah lived 70 years and begat Abram, Nahor and Haran. In fact Abram was not the oldest. Genesis 11:32 says Terah aged 205 at death (died 2083 A.M.) Acts 7:4 says when Terah died Abram left Haran. Stephen makes explicit what is implicit in Genesis 11:27–12:5, that Abram had two calls. At first call Abram left Ur, but halted at Haran. Abram was 75 when he left Haran (Genesis 12:4). Thus Abram was 75 when Terah was 205, therefore Terah was 130 when Abram was born.
2. *Birth of Joseph.* Joseph stood before Pharaoh age 30 (Genesis 41:46). At the end of 7 years plenty Joseph was 37 (Genesis 41:29–30). At the end of 2 years famine, when Jacob came to Egypt Joseph was 39. (Genesis 45:6). At end of 2 years famine when Jacob came to Egypt, Jacob was 130 (Genesis 47:9) (*i.e.* in the year 2298 A.M.). Hence Jacob was 91 when Joseph born.
3. *Birth of Levi.* His birth is not given precisely, but must be about the year given, and is accurate enough for the present purpose. His age at death is accurate (Exodus 6.16).
4. *Birth of Kohath.* Kohath was the son of Levi, and was already alive when the Children of Israel went to Egypt. Hence he was born before 2298 A.M.. Age at death accurate.
5. *Birth of Amram.* Amram was the son of Kohath. No birth date given—the birth and death dates are conjectural. Age at death accurate.
6. *Birth of Moses.* Moses and Aaron were sons of Amram (Exodus 6:20). Moses birth has to be deduced, *viz.*:
   Call of Abram to Exodus (Exodus 12:40–41) = 430 years (*N.B.* 430 years was not the length of time in Egypt, which was 215 years—clearly so in view of the Genealogy of Moses—for further details see Anstey (1913) p.113–125)
   Call of Abram to death of Joseph (2083–2369) = 286 years
   hence Death of Joseph to Exodus = 144 years
   Less Age of Moses at Exodus = 80 years (Exodus 7:7), leaves 64 years.
   Hence Moses born 2369+64 = 2433 A.M.
7. *Birth of Joshua* is not given in Scripture, the birth date given is an estimate, based on the following considerations. He was old enough to be a spy in 2514 A.M. (two years after the Exodus). He died aged 110, after entry into the Promised Land (2553), the seven years of war (2553–2560 A.M.) and after the division of the land (2560 A.M. when Caleb was 85). Age at death of Joshua is accurate.
8. These later dates are according to Anstey's chronology (Anstey, 1913), which have not been re-checked in detail. The dates are accurate enough to show that the ages achieved by the time of the Judges and Kings are comparable with those today. Ages at death are accurate.

Continued at foot of next page.

Genesis, the New Testament and Historicity

A comment on some hermeneutical issues

P. P. Duce

THE New Testament use of the early chapters of Genesis plays a key role in the arguments for the essential historicity of these chapters. This is an important third strand of positive evidence, along with the character of Genesis itself and citation of it, or allusion to it, in the Old Testament.

In our approach to the Bible, an important hermeneutical question arises for us as contemporary men and women (and members of *BCS!*): 'To what extent is the Bible—and its relevance—limited or conditioned by the history, culture, customs and modes of expression of the era in which the text was written?' Thus, with respect to the particular case under scrutiny here, it might be argued that the use of Genesis by Jesus and Paul, as first century Jews, reflects *no more* than their own historical, cultural and religious horizons. Non-evangelicals have certainly argued in this way—but this attitude can largely be attributed to 'a predisposed denial of revelation and supernaturalism, or to a personal dislike for many of the concepts of Scripture' (Kaiser, 1986 p.133). Nevertheless, the hermeneutical question cannot be avoided, and evangelicals must grapple with it. The purpose of this article is to draw attention to some aspects of the wide-reaching and complex issues which are of particular relevance in the *BCS* context.

New Testament use of Genesis and historicity

The main passages in the Pauline epistles which presuppose a historical Adam have been discussed in some detail by Carson (1980 p.28–43), who identifies the key question as not simply whether Paul *believed* in a historical Adam—'there is little doubt about that'—but whether his arguments actually require a *historical* Adam, rather than a 'mythical construct,' if they are to have any force. On the basis of *exegetical* discussion, Carson firmly concludes that Paul presents arguments which simply do not hold up without their appeal to history made known through revelation given in Genesis 1–3. A convenient summary of the arguments (which also mentions one or two key passages from the gospels) is given by Cameron (1983 p.84–91). A stimulating defence of the historicity of Adam is also given by Blocher, who rightly states that 'the presence of symbolic elements in the text in no way contradicts the historicity of its central meaning,' finds that none of the reasons put forward to identify Genesis 2–3 with myths stand up to exegetical scrutiny, and, like Carson, argues that within the broader context of revelation in the Old and New Testaments, the use of the Genesis texts only makes sense if these are essentially historical (Blocher, 1984 p.154–170).

Carson also goes on to comment that 'It should at least be clear that one's view of Adam's historicity is necessarily related to one's understanding of several other things: Paul's treatment of creation and its pre-fall goodness; salvation history and its sweep under God's sovereignty; the plan of redemption and the unique place of Christ within it; and much more. ... [I]t must be strongly insisted that the more Gen. 1–3 is relegated to the vague category of 'myth,' the more difficult it becomes to preserve the robust teaching of the Apostle himself' (Carson, 1980 p.40). In line with this conclusion, Hughes (1989 p.129) comments, 'To postulate the non-historicity of Adam and the non-temporal character of the fall may be convenient to a certain type of the modern mind, but historicity is one of the foundation stones of biblical doctrine'.

Despite such conclusions, Morna Hooker (cited by Carson) claims that 'Adam and Christ may represent two contrasting humanities, two modes of life, but the two figures who represent them are an ill-balanced pair—the

---

Continued from page 9.

References

ANSTEY, M. (1913). *The Romance of Bible Chronology*, Marshall Brothers Ltd. London. Volume 1: 302pp., Volume 2: 56pp.

KUELLING, S. R. (1996). *Are the genealogies in Genesis 5 and 11 historical and complete, that is, without gaps?* Immanuel-Verlag, Riehen, Switzerland. 46pp.

WIELAND, C. (1994). *Decreased Lifespans: Have we been looking in the right place?* Creation Ex Nihilo Technical Journal, 8 (2): 138–141.

THE AUTHOR

Richard Johnston holds a Ph.D. in mathematics, and has specialised in data analysis and mathematical modelling, especially in the solution of problems which were apparently intractable because of limited information being available. He now devotes much of his time to biblical and creation research, seeking to encourage a more critical and biblical approach to creationist scientific models.

© R. H. Johnston.

one mythical, the other historical,' and recognises the problem which this 'demythologisation' causes for the salvation-historical line as constructed by Paul (Carson, 1980 p.40). In his substantial technical commentary on Romans, James Dunn does not see this as a problem and asserts that 'an act in mythic history can be paralleled in living history without the point of comparison being lost' (Dunn, 1988 p.289–290)—which involves the idea that the slippery category of 'myth' (appropriately defined) need not imply 'untruth.'

No doubt this kind of thinking forms part of the background to Pinnock's resistance to the strong statement by Schaeffer (which echoes Carson): '... the dire warning is frequently issued that the moment one begins to move away [to] a nonliteral, non-historical reading of Genesis 2, the floodgates of criticism will open and threaten to overthrow the fundamental doctrines of Christianity. Listen to Francis A. Schaeffer: 'If Paul is wrong in this factual statement about Eve's coming from Adam, there is no reason to have certainty in the authority of any new Testament factual statement, including the factual statement that Christ rose physically from the dead" (Pinnock, 1989 p.150). Admittedly Schaeffer's claim, and its strength, should be seen in the context of the particular battles he was fighting—but Pinnock's suggested explanation for such a response is revealing. He claims that it involves:

a. the (misplaced) expectation on the part of evangelical readers of finding historical fact and scientific information in the biblical text;
b. a deep resistance to the idea that Scripture might resort to myth, legend, or saga in order to communicate its truth (Pinnock has claimed that such possibilities cannot be excluded *a priori*);
c. fear that the uniqueness and unity of humankind will be jeopardised if we grant an evolutionary theory of origins;
d. fear that the fall into sin as an historical event will be lost sight of, and with it the evangelical soteriology dependent on it (Pinnock, 1989 p.151).

In seeking to counter the impact of the Schaeffer/Carson/Blocher position, Pinnock (an evangelical) rightly states that 'the solution is to listen to the text and not let modern presuppositions overwhelm it.' However, despite his call for responsible exegesis, we might well ask whether his exegetical conclusions go far enough, and whether he himself has managed to escape from 'modern presuppositions.' Each of the points listed requires vigorous response (including affirmation!), and such response has, of course, been the work of the *BCS*, among others, over many years.

At least Pinnock appeals to exegesis: this is not always the case. Again, as Carson comments, 'It might prove helpful if theologians would stop appealing to modernity as the basis for their particular brand of scepticism, and tell us, without using any form of the word 'modern,' exactly why they cannot believe this or that notion' (Carson, 1980 p.40). Appeal is now, of course, made less to modernity than to developments within the 'hermeneutical morass' (*cf.* Carson, 1996) of *post*-modernity (see, for example, Veith, 1994). One legitimate result of such developments has been raised awareness of the fact that all knowledge is culturally conditioned by particular frameworks of belief.

Conditioning

Paul and Jesus were first century Palestinian Jews. They wore the clothes, spoke the language, *etc.*, of that time and place. They thought in the forms of the time and expressed their teaching in the ways of the time—and, of course, challenged and criticised the beliefs and attitudes of their contemporaries. They preached 'timely' truth, rather than 'timeless' truth in some detached, abstract, 'supra-cultural' sense. Similarly, all of Scripture (which provides our access to the teaching of Jesus and Paul) is time-conditioned in the sense of being not a timeless but a timely message to, and within, a particular cultural setting. Even apparently 'timeless' statements such as 'Jesus is Lord' or 'God is love' must first be considered in their cultural context (Which God? What kind of love?) before they are 'translated' into our contemporary situation (Lane, 1993).

Thus, in general, 'finite human beings have no culture-free access to truth, nor can they express it in culture-free ways. Our only hope—and it is adequate—is in every instance so to work through problems of distanciation and the fusion of horizons of understanding that the meaning of the text is truly grasped' (Carson, 1986 p.43). By this is meant that 'whenever we try to understand the thought of a text (or of another person, for that matter), if we are to understand it critically—that is, not in some arbitrary fashion, but with sound reasons, and as the author meant it in the first place—we must first of all grasp the nature and degree of the differences that separate our understanding from the understanding of the text. Only then can we profitably fuse our horizon of understanding with the understanding of the text—that is, only then can we begin to shape our thoughts by the thought of the text, so that we truly understand them. Failure to go through the distanciation before the fusion usually means there has been no real fusion; the interpreter thinks he knows what the text means, but all too often he . . . has simply imposed his own thoughts on the text' (Carson, 1984 p.21–22).

Thus, 'to interpret the Biblical text ... involves a *contextual shift*. Even when I seek merely to express what Paul meant, for example, I am constrained to do so in *my* situation: with English rather than Greek, with modern rather than ancient idioms, with Western nuances rather than Middle Eastern thought forms. In other words, all forms of interpretation necessarily include a measure of *contextualization*. This point is a little frightening because it appears to relativize Scripture. On the contrary it should remind us of the relativity of our interpretation, because we are weak, limited, ignorant, and sinful. God's truth remains sure, while our perception of that truth may need to change' (Silva, 1987 p.23).

'Indeed, the Biblical word did come to specific people in a specific setting during a specific time with specific idioms. Why then should these very characteristics of revelation, which were so helpful to the people in their first reception of the message, now be used as an argument against its trustworthiness by a later generation—a generation that boasts of a knowledge superior to the ancients?' (Kaiser, 1986 p.133).

Inerrancy

One approach to such hermeneutical issues has been to argue that the doctrine of inerrancy *entails* certain interpretive conclusions. However, as Silva points out, this actually undermines the very task of interpretation. 'The truth of scriptural authority does not automatically tell us what a given passage means: it does assure us that, once we have correctly identified the biblical teaching (in other words, proper interpretation is assumed), that teaching may be trusted unequivocally.... [A] sincere and intelligent commitment to the classical doctrine of biblical inerrancy in no way guarantees that an individual will adopt expected interpretations' (Silva, 1987 p.4).

Silva considers the historicity of Genesis 1–3: 'All inerrantists, as far as I know, believe in the factual character of that material. This state of affairs creates a certain presumption that inerrancy by itself demands such an interpretation. But the presumption is false; indeed, it is an equivocation. The doctrine of biblical infallibility no more requires that certain narratives be interpreted literally than it requires that certain prophetic passages be interpreted literally. That decision must be arrived at by textual evidence and evidential argument.

'Now I happen to believe that the essential historicity of Genesis 1–3 is a fundamental article of Christian orthodoxy. It would surely require hermeneutical prestidigitation to argue that the original writer intended those chapters as any less historical than the later patriarchal narratives (and could the original audience have discovered any such distinction between the early and the later chapters of the book?). For that reason and others, such as Paul's argumentation in Romans 5 and 1 Corinthians 15, I would want to argue very strongly that the proper interpretation of the Genesis material is one that does justice to its historical claim.

'And yet I would want to argue just as strongly that such an interpretation is independent of my commitment to inerrancy. These are two distinct questions. Of course, once we have established exegetically that the first three chapters of Genesis teach historical facts, then our belief in infallibility requires us to accept those chapters as factual. But infallibility, apart from exegesis, does not by itself determine historicity. Otherwise we would be obligated to accept as historical Nathan's story in 2 Samuel 12:1–4 or even the parable of the trees in Judges 9:7–15' (Silva, 1988 p.74–75).

Furthermore, it is worth remembering that 'inerrancy' is itself a doctrine, of considerable sophistication, derived from Biblical interpretation. That our understanding of the Bible depends in turn on prior doctrinal knowledge is an aspect of the 'hermeneutical circle.' The same point applies to other, related, 'theological' responses: for example, affirmation of the trustworthiness of the teaching of Paul (an inspired apostle) or of Jesus (the Son of God) does not short-circuit the need for exegetical argument—of the kind undertaken by Carson, for example.

The hermeneutical circle need not be vicious, but rather represents a benign spiral.

A hermeneutical spiral

An overall view of Biblical authority underlies and controls evangelical interpretation of Scripture. Packer expounds the concept of the hermeneutical circle to show that exegesis, synthesis and application are determined by a hermeneutic (view of the interpretive process) which is determined by an overall theology, which in turn supports itself by exegesis, synthesis and application (Packer, 1983 p.348–349).

This circle is one of successive approximation—a spiral towards more well-tested understanding, involving two complementary processes: questioning the text and allowing it progressively to reshape the questions put to it; and reciprocal illumination between the parts of the text and the whole. Interpretation and presuppositions are both modified within the spiral as it converges to more precise and profound understanding.

Hence, to learn the doctrine of Scripture and its authority the evangelical goes to Scripture itself—initially, with provisional presuppositions ('pre-understanding'). From this doctrine, a set of hermeneutical principles are derived, by theological analysis. With these, the text is revisited in order to expound and apply it more rigorously. The interpreter moves along the hermeneutical spiral: 'If his exegetical procedure is challenged, he defends it from his hermeneutic; if his hermeneutic is challenged, he defends it from his doctrine of biblical authority; if his doctrine of biblical authority is challenged, he defends if from biblical texts by exegesis, synthesis and application. At no point does he decline to accept challenges to his present view of things, but at every point he meets them by renewed theological exegesis of relevant passages in the light of the questions that have been asked' (Packer, 1983 p.349).

Against this general background, the question of the historicity of the Genesis passages can be seen to involve a number of interrelated issues:

1. exegesis of the Hebrew literature of Genesis 1–11 in a way that does justice to theology and historicity;
2. exegesis of other scriptural passages which use, or allude to, Genesis;
3. how the overall doctrine of Scripture (authority; infallibility) is understood;
4. how the historical Jesus of the gospels (who quotes Genesis) is understood (Christology);
5. how the biblically-derived doctrine of common grace is understood, particularly when applied to the achievements, and evolutionary theories, of modern science (*e.g.* optimism or pessimism with respect to any naturalistic bias within the largely secular academy);
6. the general framework of implicit or explicit technical assumptions, ideological commitments and overall

epistemology which form the context for (or determine?) answers to the specific questions.

These issues all intertwine within the hermeneutical spiral. Disagreements over the historicity of early Genesis should be seen in this rather complex context. Very briefly, the 'UK establishment' position may be characterised as one which:

a. adopts a form of 'literary' approach to Genesis which sidesteps any historical implications (Ancient Near Eastern [ANE] polemics and theology only);
b. accepts evolutionary theories of origins;
c. relates *a.* and *b.* using the particular form of 'complementarity' which is theistic evolution;
d. perhaps adopts a view of scriptural infallibility which does not necessarily apply to incidental scientific, geographical or historical details;
e. insists that New Testament use of Genesis can be understood adequately without a historical Fall;
f. is optimistic that any naturalistic bias and distortion in the various sciences, as practised in the largely secular academy, can be fairly readily recognised and separated out from the healthy, 'genuinely scientific' core.

In contrast, what might be called the 'minority report' (such as that of the *BCS*) argues for:

a. ANE polemics, theology and history/special creation (but not 'science') in Genesis, on the basis of both Old Testament and New Testament exegesis;
b. inadequacy in biological macro-evolutionary theory;
c. special creation, distinction between creation and providence, a historical Fall;
d. (much) more hesitancy over whether naturalistic bias in the sciences is as easily identifiable and separable as might be claimed (and asks what should characterise 'authentic science');
e. proper integration between Biblical and empirical scientific data or other historical data;

—and stresses that none of these responses need imply 'fundamentalism' or an anti-science attitude.

Conclusion

In our approach to Genesis, and its use in the New Testament, we must not fail to recognise the historical and cultural distance between the biblical and modern worlds, and the length of the bridge needed to cross this gulf. Specifically, while arguments from the New Testament for the historicity of early Genesis are demonstrably sustainable, we should be aware of the hermeneutical issues which surround such arguments. As far as possible we should seek to protect our interpretive conclusions from 'naïve empiricism in a hermeneutical vacuum' (a phrase used by Corner, 1990 p.245).

References

Blocher, H. (1984). *In the Beginning.* IVP, Leicester.

Cameron, N. M. de S. (1983). *Evolution and the Authority of the Bible.* Paternoster, Exeter.

Carson, D. A. (1980). *Adam in the Epistles of Paul,* in Cameron, N. M. de S. (ed.), *In the beginning ... A Symposium on the Bible and Creation.* Biblical Creation Society, Glasgow.

Carson, D. A. (1984). *Exegetical Fallacies.* Baker Book House, Grand Rapids.

Carson, D. A. (1986). *'Recent Developments in the Doctrine of Scripture,'* in Carson, D. A. and Woodbridge, J. D. (eds.), *Hermeneutics, Authority and Canon.* IVP, Leicester.

Carson, D. A. (1996). *The Gagging of God,* Part One. Zondervan, Grand Rapids.

Corner, M. (1990). *Fundamentalism,* in Coggins, R. J. and Houlden, J. L. (eds.), *A Dictionary of Biblical Interpretation.* SCM, London.

Dunn, J. D. G. (1988). *Romans 1–8 (WBC)* . Word (UK), Milton Keynes.

Hughes, P. E. (1989). *The True Image.* IVP, Leicester.

Kaiser, W. C. (1986). *Legitimate hermeneutics,* in Kim, D. K. (ed.), *A Guide to Contemporary Hermeneutics.* Eerdmans, Grand Rapids.

Lane, A. N. S. (1993). *'The humanity of Scripture,'* course material from London Bible College BA .

Packer, J. I. (1983). *Infallible Scripture and the Role of Hermeneutics,* in Carson, D. A and Woodbridge, J. D. (eds.), *Scripture and Truth.* IVP, Leicester.

Pinnock, C. H. (1989). *'Climbing out of a swamp.'* Interpretation, 43:150. [The article has 'move away from,' which must be an error!]

Silva, M. (1987). *Has the Church Misread the Bible?* Apollos, Leicester.

Silva, M. (1988). *Old Princeton, Westminster, and Inerrancy,* in Conn, H. M. (ed.), *Inerrancy and Hermeneutic.* Baker Book House, Grand Rapids.

Veith, G. E. (1994). *Guide to Contemporary Culture.* Crossway, Leicester.

THE AUTHOR

Phil Duce has written for our journal before. He holds a Ph.D. in chemistry from the University of Leicester and was an ICI Research Fellow carrying out fundamental research into hydrogen-bonding. After working as a Senior Research Assistant at the University of Liverpool, he took up full-time theological study, gaining an M.Th. for a thesis on science and hermeneutics.

Corrections to *Origins 23*

A number of mistakes occurred in Steven Robinson's article on the geological column:

On page 20, last paragraph, 'over 150 Cretaceous—Tertiary' should read 'over 100 Cretaceous—Tertiary'

On page 23, the heading commencing *'3. Somewhere the middle Ordovician grades unconformably'* should read *'3. Somewhere the middle Ordovician grades conformably.'*

The next paragraph should read: 'Morris makes this theoretical claim in the course of developing an argument that the whole geological column was laid down continuously and rapidly. It had to have formed rapidly because, he alleges, neo-catastrophists now recognise that 'every deposit has been formed very rapidly'; indeed, some suggest rather the contrary. This breath-taking statement is undocumented and untrue. ...'

The cover photo was reversed and so the caption (on the contents page) should be appropriately amended.

We apologise to our readers for any confusion arising from these errors.

The *Real* Lifestyle of the Dinosaurs

Michael Garton

AS I passed a packet of dinosaur doughnuts in the supermarket recently, they reminded me of David Tyler's (1993) comments that *Jurassic Park* fever had 'gripped the nation, as is apparent in books, posters, toys, cornflake packets, TV, computer games and even fast food.' Dinosaurs have held a fascination since before the time of Job—the recent release of the film *The Lost World* follows a long tradition.

These awesome beasts—the greatest animals God caused to walk on face of the earth—are described in Scripture as 'the chief of the ways of God' (Job 40:19). It is rather surprising to find (quoting Tyler again) that 'Christian perspectives in this area are somewhat mute ...'

Most of us learn about dinosaurs* by reading books—and cornflake packets!—and by visiting museums, but the power of computer imagery must also affect the way we understand dinosaurs—*Jurassic Park* was 'the most successful film ever.' In the sequel the dinosaurs are even more terrifying. If dinosaurs became extinct millions of years before man, we can view dinosaur thrillers with some detachment. But the obvious tenor of Scripture is that in the beginning God made dinosaurs along with man, and that we co-existed with them (Job 38–41). The Lord readily declares that it was He who created the dinosaurs and that He wants men to face up to who He is through them. How, then, do they fit into the history of this planet? Was their role really to terrorize the planet and make a breakfast out of everything that moved?

I want to try and make sense of these animals by looking at the geological evidence for the dinosaur in its context. In particular, we will consider fossilised dinosaur tracks, reconstructing their actual movements and the type of ground they were walking over. Museum skeletons may be wonderful, but such remains are divorced from all the other evidence in the rocks that contained them. Without such constraints, our imagination runs freely. Spielberg began with museum dinosaur skeletons but all the rest—dinosaurs depicted as entirely land-dwellers in a mature environment with its lush jungle—is pure invention. It is not even part of that *genre* of well-researched historical fiction from which people might learn something useful.

As we shall see, this problem of misunderstanding the dinosaurs and their environment is not confined to film-makers and it has a very long history.

Scientific views of the dinosaur

The first recorded discovery of dinosaur tracks was made in Massachusetts, by Pliny Moody in 1802 (Steinbock, 1989). At the time a local newspaper declared them to be the footprints of Noah's raven, a bird several metres tall! Many more such tracks were carefully described by Hitchcock in 1836. Influenced by evidence from tracks rather than bones, he retained the suggestion that the tracks were made by giant birds.

In Britain the first dinosaur tracks were described in 1846. By this time there was some questioning as to whether they really could have been made by giant birds, particularly since Gideon Mantell had already described

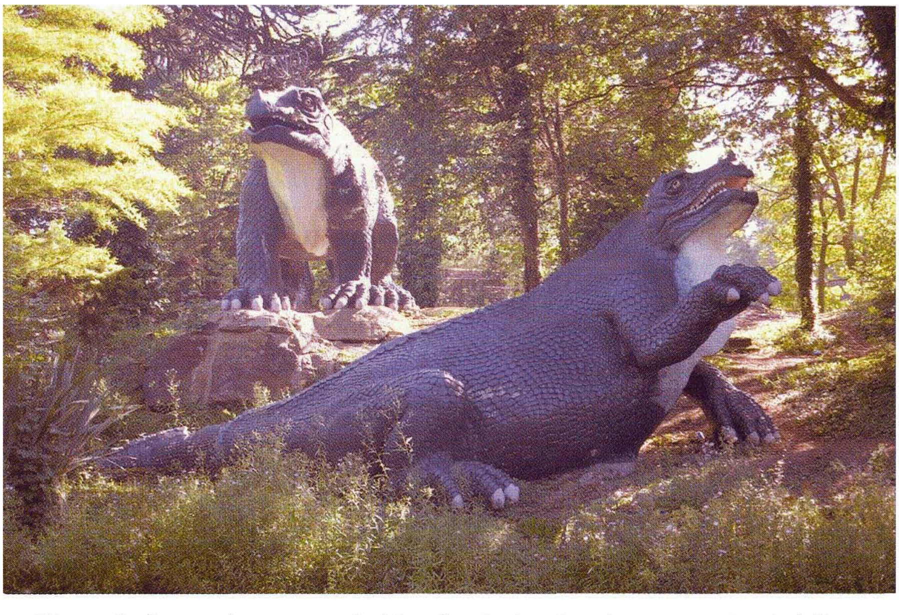


Figure 1: Iguanodon as a primitive, lumbering beast, as reconstructed from fossilised bones for the Great Exhibition of 1851. The models were subsequently moved to a theme park at Crystal Palace, south east London, where they can still be seen today.

---

* *Editorial Note:*—The use of the term 'dinosaur' in this article is clearly non-specific, but we recognise that it is used in the popular sense. Readers will appreciate that certain points apply to specific examples of dinosaur, but we believe that retaining the generalisation of expression aids the non-technical reader to understand the thrust of this article.

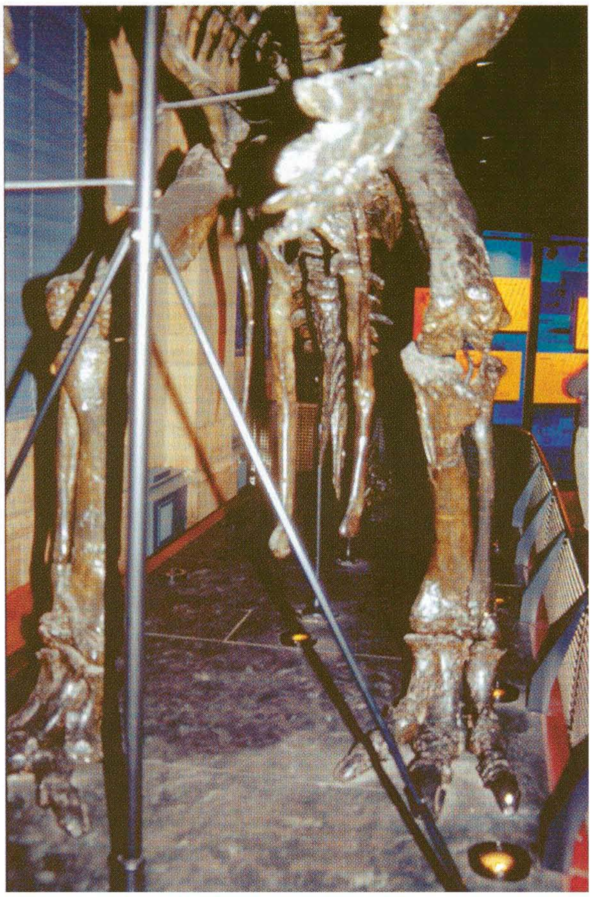


Figure 2: A view between the legs of an iguanodon skeleton as reconstructed last century, with the tail resting on the ground. However, amongst thousands of fossilised dinosaur tracks of all types, tail drag marks are extremely rare, indicating that their tails were held aloft.

large bones—and coined the name Iguanodon—in 1822. Whereas most of the tracks suggested enormous animals with bird-like agility, the fossil bones that were available were harder to interpret. They lay crushed, distorted and incomplete in the rock. Since fossil tracks had only recently been discovered, their importance was easily overlooked (and they continued to be ignored for over a century!). As always, the prevailing world view of the scientists influenced how the dinosaur bones were interpreted and their skeletons put together.

Although many scientists in the early and middle part of last century professed to be evangelical Christians, they held views about origins which were less than biblical. Although this era was prior to the publication of Darwin's *Origin of Species,* there was already widespread support for a belief in successive creations, with each stage exhibiting a progression of development. Thus, when describing some small tracks, Dr. Buckland (quoted in Hitchcock 1844, p.321) could say that

'... the reptiles that crawled upon the *half finished* surface of our planet have left memorials of their passage enduring and indelible' [emphasis added].

Hitchcock (1851) envisaged the Massachusetts tracks fitting into a world where '*advance* has been by special creative acts, and not by infinitesimal development' *[emphasis added].*

Faced with only fragmentary dinosaur bones for a reconstruction and, apart from observing that they had some reptilian characteristics, the scientists had little evidence to guide them. In such circumstances, it is hardly surprising that their world view—their belief that the organic world had been more primitive in earlier times—dominated their conception of the animals to which these bones belonged. Dinosaur models prepared for the 1851 Great Exhibition at Crystal Palace consequently portrayed primitive, lumbering beasts (Figure 1).

Once a particular way of looking at something has been adopted, it is remarkably difficult for people to change their ideas. Although during this century dinosaurs in books and museums have been drastically slimmed down, nevertheless the prevailing view that life is progressing to greater complexity and efficiency has continued to encourage the traditional popular image of the lumbering dinosaur.

Even the scientists continued to cling to false ideas about dinosaurs. Only in about the last decade have efforts finally been made to correct the earlier dinosaur reconstructions which erroneously showed the tail resting on the ground (Figure 2). Yet, ever since young Pliny Moody discovered the first fossil tracks in 1802, the tracks

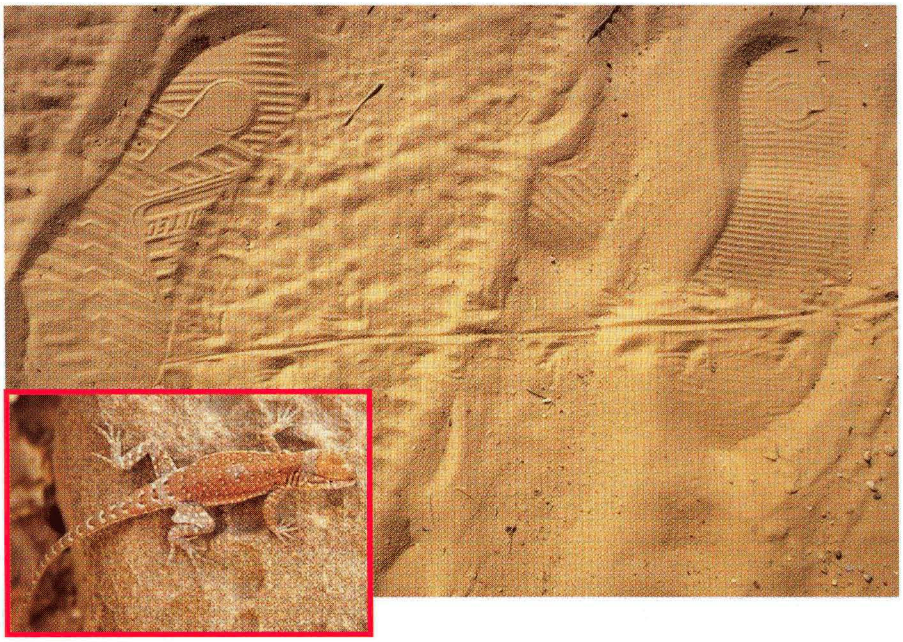


Figure 3: Lizard track running left to right across my shoe and vehicle marks. The sprawling gait of the lizard causes the tail to drag in the sand. Painted Desert, Arizona.

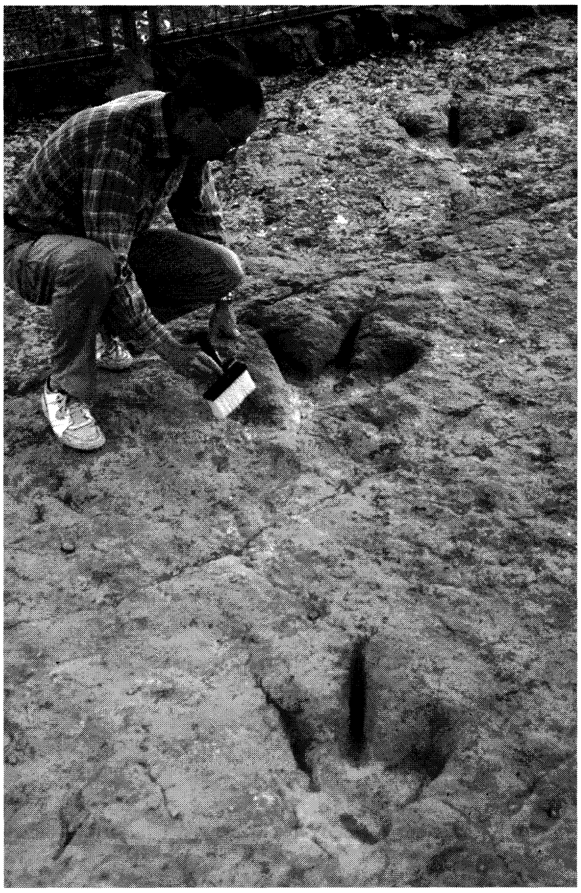


Figure 4: Track of a carnivorous dinosaur across what was once soft, slimy mud. The mud partially infilled the cavities immediately after they were made. With the tail held out horizontally, dinosaurs were able to walk across this sort of ground without difficulty. Steven Robinson is seen preparing the site for photography.

have testified that dinosaurs were wonderfully agile and did *not* drag their tails!

This misconception arose because these animals were thought to be somewhat analogous to lizards—that is how they got the name dinosaurs ('terrible lizards'). Lizards rest their tails on the ground, and when they run they leave a tail drag mark in between their splayed out foot marks (Figure 3). By contrast, amongst the hundreds of thousands of dinosaur tracks, tail drag marks are almost unknown. So it is certain that dinosaurs did not have the sprawling posture of reptiles, and we can infer that when they walked on land the tail was a balancing organ held aloft.

Leaving behind the image of the primitive dinosaur, we need to consider afresh these majestic beasts, the awesome tail outstretched behind to cantilever the neck held out horizontally in front. Many fossil tracks indicate that they were walking over soft, muddy ground, frequently in shallow water. Scheven (1995) is surely correct to emphasise the importance of the tail in making them adept swimmers. We must think of beasts equally at home in water and on land. Superbly balanced, they appear to have had no difficulty negotiating surfaces we regard as muddy (Figure 4)—slippery and treacherous places where we would soon fall over or lose our wellies!

The unstable world of the dinosaurs

What are we to make of the 'Age of the Dinosaurs?' I have no doubt that there was a period when dinosaurs were extraordinarily abundant. Nor do I doubt that the era of dinosaur abundance came to an end and was succeeded by the era dominated by mammals.

In Spain (and indeed across the Euro-Asian continent) dinosaur bearing strata can be shown to predate, and become squashed and folded during, the Alpine-Himalayan mountain building, whereas the strata containing mammalian remains are contemporary with or came after the mountain building. Using the mountain building event as a crude time marker, we may therefore be certain that the 'Age of the Dinosaurs' predates that of mammalian abundance. Bird tracks indicate that although birds thrived with the dinosaurs, they became more abundant later, living alongside the mammals.

Mountain building implies the movement of continental blocks which in turn leads us to expect signs of crustal instability, including earthquakes. Many dinosaurs were still alive as the Alpine and Pyrenean mountains began to rise. At home on the vast mud-flats, stretching for hundreds of miles, they could cope as the sea swept in and out and

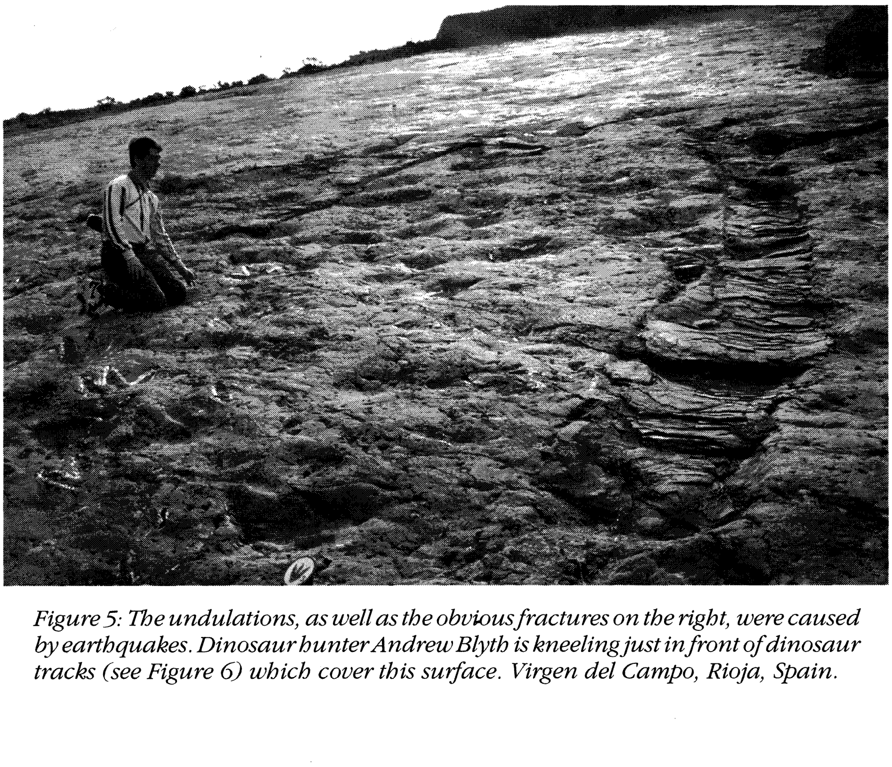


Figure 5: The undulations, as well as the obvious fractures on the right, were caused by earthquakes. Dinosaur hunter Andrew Blyth is kneeling just in front of dinosaur tracks (see Figure 6) which cover this surface. Virgen del Campo, Rioja, Spain.

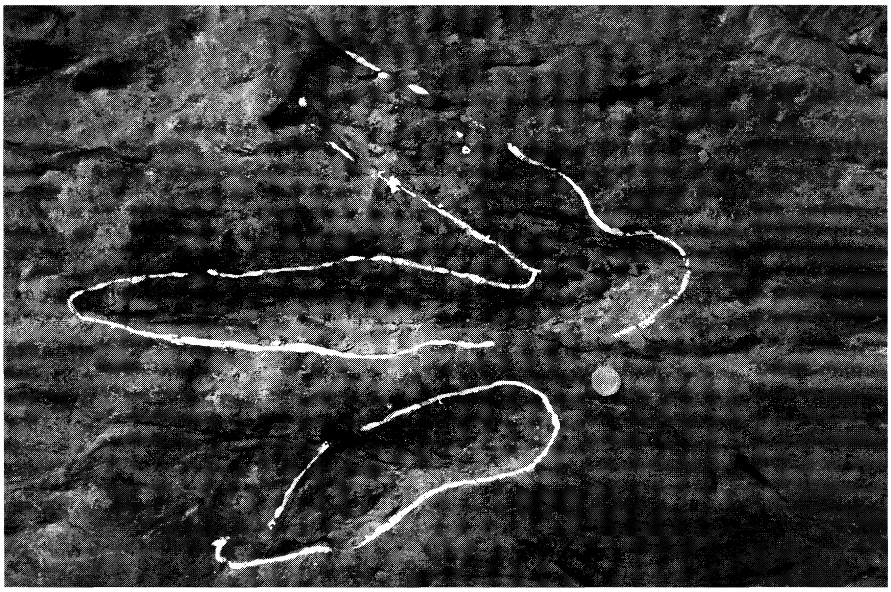


Figure 6: Soon after it was made, this dinosaur print was deformed in an earth tremor. The earthquake shook some water out of the still-soft sediment, forcing it to escape through fissures which ran from left to right. These 'water escape structures' distort the footprint, showing that the tremor happened after the dinosaur passed by. Virgen del Campo, Rioja, Spain.

as the land rose and fell in response to the mountain building. As the earth shook, the surface sediments were disturbed (Figure 5), so that sometimes freshly made dinosaur tracks are demonstrably deformed by a subsequent tremor (Figure 6).

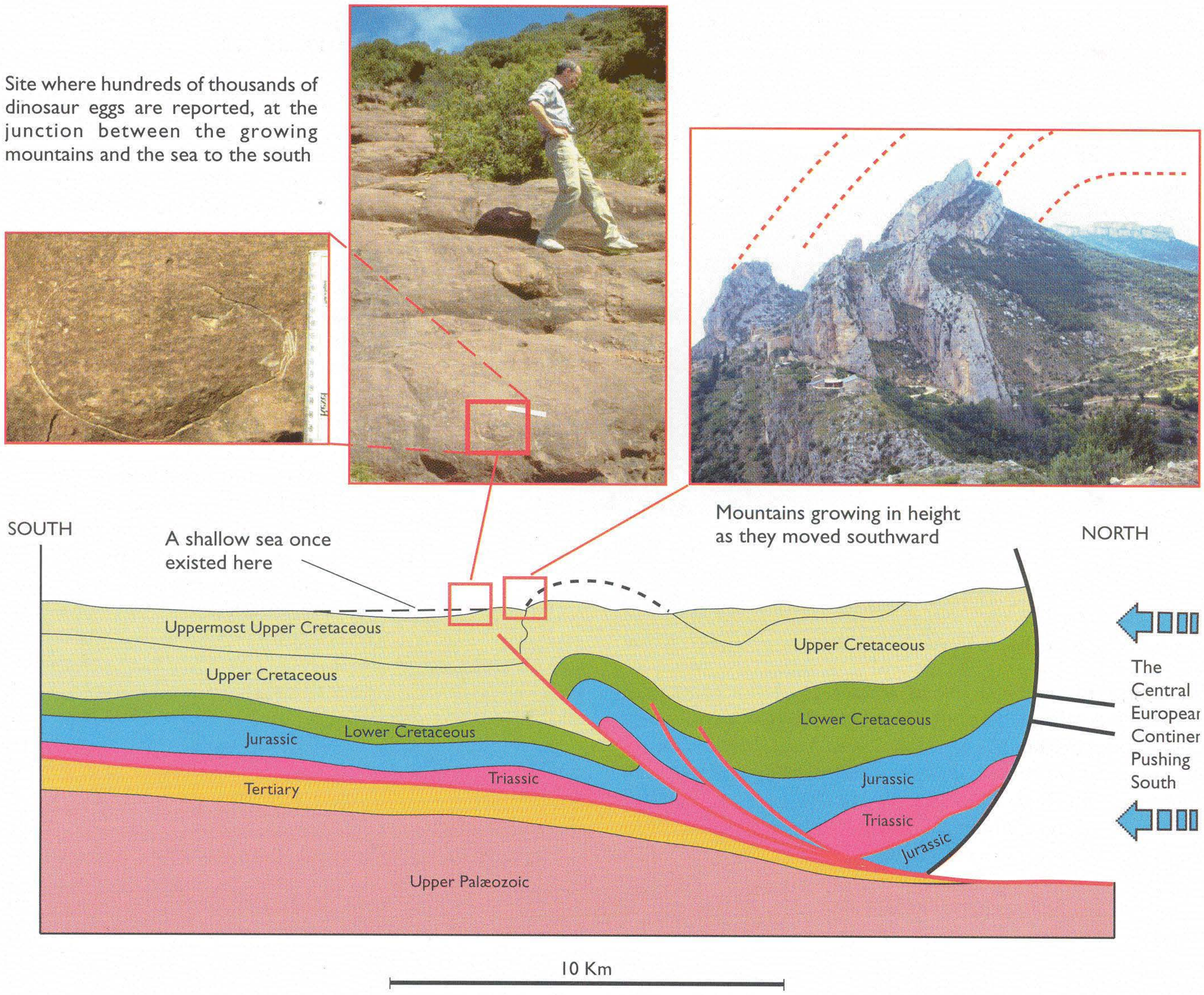
Yet, in all this instability, these animals were tremendously reproductively successful. In stressed conditions it is known that animals reproduce rapidly, and 'go forth and multiply' the dinosaurs most certainly did! Dinosaur eggs and nests are known from around 200 sites worldwide (Currie, 1996). Extraordinary numbers of eggs are estimated at some sites; Sanz *et al.* (1995) estimate that hundreds of thousands of eggs lie in a small area on the south side of the Pyrenees. Here, as continents collided, mountains were being thrust up. As a crude analogy, think of a bulldozer pushing sand into the sea (Figure 7). The bulldozer represents France and the central European continent pushing southwards into Spain, the pile of sand the Pyrenean mountains formed as the continental blocks collided. As the bulldozer moves towards the sea, the pile of sand moves into the water. In the same way, the growing mountains moved southwards into a shallow sea that once spread across northern Spain. It was at this junction of the sea and land that dinosaurs laid so many eggs (Figure 8). They were fossilised through rapid burial in this unstable environment.

The short-lived world of the dinosaurs

The very fact that so many fossilised dinosaur tracks exist (and new ones are being discovered at the rate of about one every week (Lockley and Hunt, 1995 p.xvii)) is itself remarkable. Today, aside from the inadvertent dog or child prints in quick-setting concrete, animal track preservation is extremely rare. The preservation of even one dinosaur track therefore ought to be considered as remarkable. Yet such tracks are very abundant in the western U.S.A., and northern Spain is one of the best European localities for dinosaur tracks. In both places it is clear that dinosaurs were repeatedly walking across vast mud-flats—hundreds of miles in extent—that were close to sea-level. The sea, or brackish water, repeatedly swept across these flats, blanketing them in sediment and preserving the newly formed tracks.

The age of the dinosaurs supposedly lasted over 140 million years. On modern uniformitarian reasoning, water supposedly flooded in and preserved the tracks every few thousand years.

Figure 7: The bulldozer represents France and central Europe pushing into Spain, the pile of sand being equivalent to the Pyrenees. As the mountain grew higher (bulldozer pushing forward), the mountains also grew wider (more and more sand piling up in front of the bulldozer). The mountains were advancing across a shallow sea which covered northern Spain. Dinosaurs were laying their eggs in this dynamic and unstable environment along an ever changing shoreline. Photograph courtesy of Master James Garton and his sand pit.



Site where hundreds of thousands of dinosaur eggs are reported, at the junction between the growing mountains and the sea to the south

A shallow sea once existed here

Mountains growing in height as they moved southward

The Central Europea Contine Pushing South

Figure 8: Cross section of the Bastus area, Tremp, Spain (simplified from Vergés and Muñoz (1990). The inset pictures show the site where 300,000 dinosaur eggs are reported, a detail of an egg from the bottom of the same picture, and the mountains as they are today.

On a modern beach which is exposed for only a few hours (and ignoring for now the fact that present day footprints are not preserved), tracks rapidly lose definition as time passes and repeated newer generations of footmarks often cross older ones producing hopeless confusion. By contrast, the dinosaur tracks are well defined, and there are usually relatively few tracks, so that each may be clearly distinguished. Moreover other features may suggest that a foot-printed surface was not exposed for long: for example, the presence of only a small amount of burrowing by small marine animals living on the same surface indicates minimal exposure. It would therefore be unreasonable to believe that most surfaces with dinosaur tracks were left uncovered for any length of time. Tracks are usually well preserved, which also suggests that they were buried soon after they were made, without time for deterioration before the next layer of sediment was laid down. Again, irrespective of whether or not the tracks cross, the sediment usually appears to have been of similar consistency throughout the whole time that the tracks were being made—they were all made at about the same time. Hence, even sites with prolific numbers of tracks are likely to have been made in a few hours or days rather than over periods of years, a suggestion sometimes noted in the literature (*e.g.* Lockley and Hunt, 1995 p.202).

On a normal beach today, tracks are eroded or obliterated completely by the next flow of water. For so many tracks to have been preserved, and so well, the conditions in the mud must have been unusual. The mud of these shallow marshy seas was rich in calciferous material—just like cement. So just like the child and dog prints captured in the quick setting concrete, the dinosaur tracks were preserved by the same mechanism—when the waters receded and the mud started to dry, its surface permanently hardened sufficiently to prevent the footmarks being erased by the next inrush of water. Nevertheless the surfaces with the

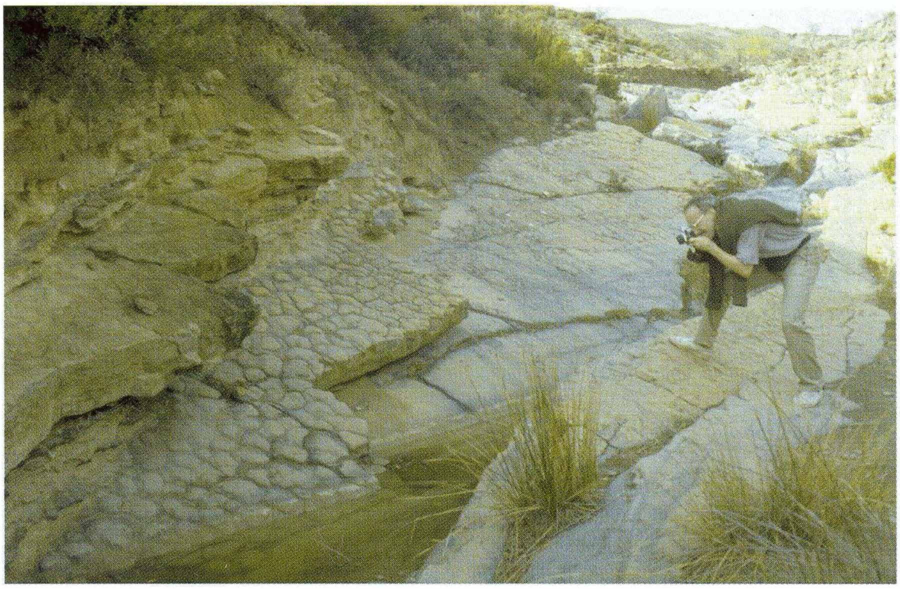


Figure 9: A surface with mud-cracks. Once horizontal mud-flats, they have hardened and been folded as the Pyrenean mountains began to form.

tracks cannot have been exposed for long before they were again covered with water or sediment, since, if the mud dries out more fully, it cracks, giving the appearance of cobbled pavements (Figure 9).

The dinosaurs were abundant and sediment-laden water certainly swept repeatedly across the flats as described. If these influxes of sediment were only occurring at widely separated intervals over millions of years, as claimed by conventional geology, then it is surprising to find that tracks are often preserved at only a very few levels (*i.e.* only in a tiny proportion of the total number of levels of suitable rock) at any one place. If there was plenty of time for the dinosaurs to re-invade the area, which must be the case if inundation was really so infrequent, why are their tracks not more pervasive at many more levels? This surely suggests that sedimentation was much more rapid, such that the dinosaurs often did not have time to re-establish themselves.

If sedimentation were indeed rapid, then the track bearing layers may have been those layers which lay exposed for sufficient time—there was a long enough pause in the sedimentation—for the dinosaurs to walk across them. This is confirmed by the observation that dinosaur tracks are not infrequently found on surfaces where clams or other burrowing fauna have had time to establish themselves (Figure 10)—though, as mentioned already, the limited extent of their burrowing implies that the surface was not exposed for very long (Lockley, 1991; Morton, 1987, 1995)

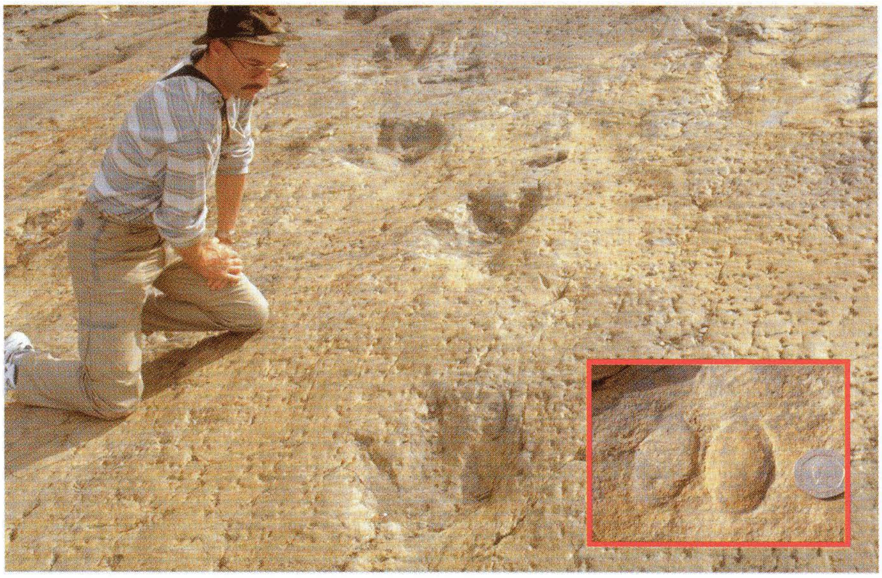


Figure 10: Track-bearing layers appear to correspond to surfaces where there was a short pause in sedimentation, giving the dinosaurs time to invade the area. Here, dinosaurs walked across a pock-mocked surface. Holes mark the burrows of clams which have had sufficient time to establish themselves on the surface before the dinosaurs arrived. Their fossilised shells [insert] lie strewn across the surface. Virgen del Campo, Rioja, Spain.

Why so many dinosaurs and no mammals?

There can be little doubt that there were large numbers of dinosaurs, as can be demonstrated by one remarkable layer south of the Pyrenees dubbed 'Parc Cretacio' (Cretaceous Park) by the Spanish Tourist authorities (Figure 11). Here many large sauropod dinosaurs wallowed in shallow water, presumably feeding from floating plant material. They do not appear to have been attempting to travel in any systematic direction.

How do we explain the lack of mammalian evidence, neither fossil tracks nor body fossils, in the period dominated by the dinosaurs?

First we must decide whether the dinosaur fossils were formed during the Flood, or afterwards. Creationists often suggest that these were pre-Flood dinosaurs, which (along with birds) perished during the Flood. However, their tracks are found high in the succession of strata, implying that they survived until late in the Flood year. It has been stressed elsewhere (Garton (1996, 1997), Johnston (1997)) that this is at variance with what would be expected of the Flood as an expression of God's judgment. Moreover, geologically, if they did survive so long, an adequate mechanism has yet to be advanced for what could have killed every single bird so late in the Flood year.

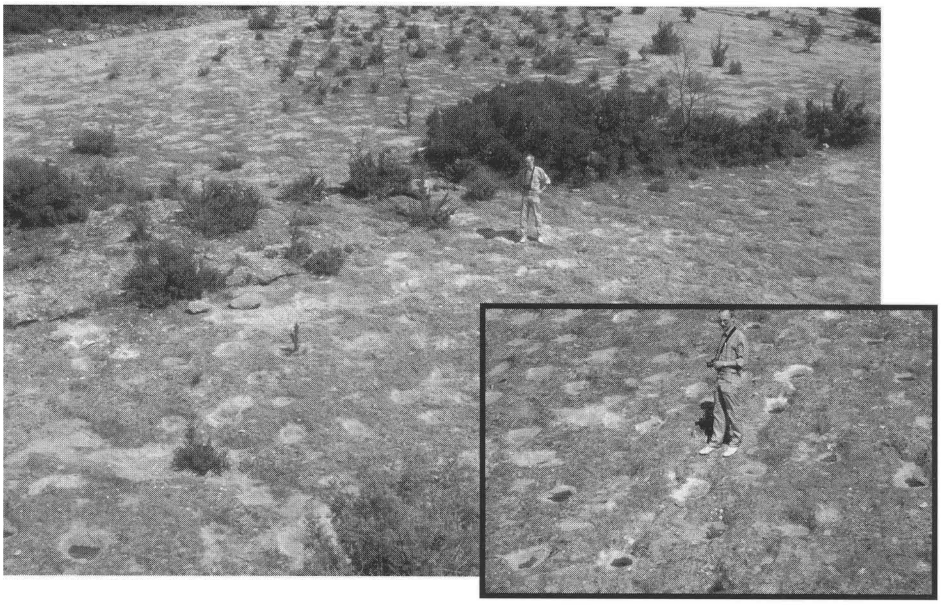


Figure 11: Many large sauropod dinosaurs appear to have wallowed in mud on vast flats in front of the growing Pyrenean mountains. Each hole marks a footprint. This remarkable surface, once very extensive, is now exposed over an area equal to several football pitches. The Spanish tourist authorities have called this 'Parc Cretacio.'

Remember that large areas of western Iberia were above the sea when the dinosaurs were abundant in Jurassic and Cretaceous times. Yet more areas were elevated from the middle of the Cretaceous onwards as the Alpine/Pyrenean mountains grew. There were plenty of refuges to escape the Flood waters, which surely must have been forming if this was still part of the Flood year. And Garner's (1996) argument that repeated nest building during the Flood is unreasonable also has yet to be adequately answered.

If, on the other hand these are post-Flood dinosaurs which reached their acme *after* the Flood, the lack of contemporary mammalian remains must arise from small populations and other causes—like their choice of habitat—which result in a low probability of fossilisation.

Any creature is unlikely to be found fossilised if only a small number exist. Many examples could be cited—the absence of Cœlacanth fossils after Cretaceous strata is well known. Hence the fish was believed to be extinct until one was caught in 1938. Similarly, we know that at least a few dinosaurs survived until the time of Job even though fossils are again unknown after the Cretaceous strata.

Morton (1982) noted that the occurrence of amphibian, reptile and mammal fossils mirrored their reproductive rates. This corresponds with what the post-Flood model would predict: after the Flood, aquatic and amphibian animals would be expected to appear in the fossil record first, followed by quick-breeding land animals, and finally those, like mammals, which breed slowly.

Dinosaur nests are known with more than 20 eggs and some even had more than 40 (Young, 1965). Dinosaur populations could therefore have very rapidly exploded after the Flood, especially if there was little competition for the available food resources. Their design made them ideally suited to these shallow-water marginal habitats, lying between the fully aquatic and terrestrial habitats. This—combined with their large size—meant that they could cope with the instability of their Mesozoic world where shallow water repeatedly invaded large areas of the continents. It is therefore hardly surprising that they flourished in such abundance: they enjoyed vast areas of their ideal habitat.

In complete contrast, this sea-margin habitat did not suit the mammals—even today they are largely lacking from the nearest modern analogue, the shoreline and estuarial habitat (where there are still plenty of birds)—so it is not surprising that mammalian fossils and tracks are not found alongside the dinosaurs. Moreover, the period of the rapidly shifting shorelines of the Mesozoic was difficult for man (Genesis 11:2a) and other land mammals: they would have had to take refuge on one of the stable cratonic areas that do not appear to have been flooded during the Mesozoic (Garton, 1991 p.11). Because mammalian reproductive rates are lower, their numbers increased less rapidly. And they would have sought high ground well away from the shifting seas and influxes of sediment necessary for fossilisation. Hence their preservation as fossils was most unlikely during the Mesozoic.

After the Cretaceous, geological events became more localised, providing opportunities for mammals to spread across the globe. By this time their numbers were increasing and, as conditions became somewhat more stable, more good mammalian habitat became available, so that the mammals in their turn were able to proliferate. The Tertiary world was still geologically unstable, and many land mammals became fossilised as a result of the sudden, violent but local flooding that was associated with mountain building. This explains why mammalian fossils only become common in the Tertiary.

Making sense of it all

Jurassic Park and *The Lost World* leave with us, not only the usual propaganda message that the dinosaurs were the evolutionary precursors to birds, but also the impression that dinosaurs lived in lowland plains and forests and were so terrifyingly aggressive that it is inconceivable that man and dinosaur could ever have coexisted. These films stand at the end of a long line of misconceived representations of the life of the dinosaurs.

In reality, the fossil record of dinosaurs suggests they lived in a geologically unstable world, containing huge, and ever changing, salt flats on a scale quite unfamiliar to us. Dinosaurs were designed to prosper on these

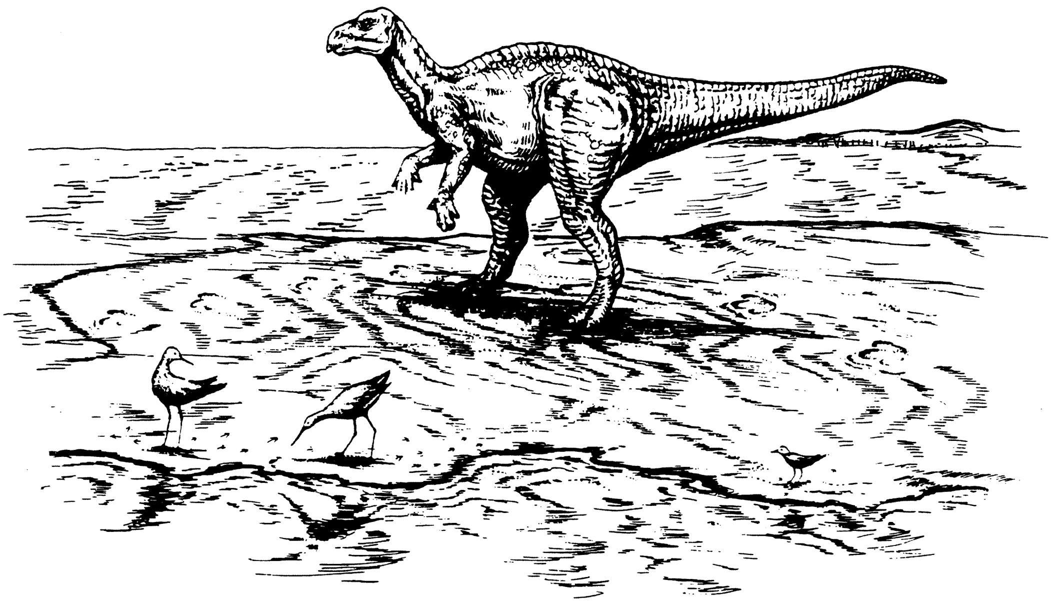


Figure 12: The lonely and ever-changing world of the dinosaurs. Adapted from Lockley et al. (1992).

extraordinary brackish flats extending for millions of square miles and were able to cope with the ebb and flow of water. By the time the upper Cretaceous strata were forming, the number of fossilised eggs suggests that the dinosaur population growth was approaching Malthusian disaster.

There are many competing theories to account for the demise of the dinosaurs and controversy arises because each fails to be fully convincing. On the much shorter creationist timescale, the combination of many factors more obviously leads to the death of most dinosaurs. There were at least four significant events, all occurring within a decade or so. The impact of a large asteroid is well known, correlating with the latest Cretaceous strata but there were several significant impacts in the preceding years. There was also extensive volcanism. Such events would have had major atmospheric and climatic implications, as would the sudden upthrust of the Alpine-Himalayan mountains. At the end of the Cretaceous period, sea-levels, which had hitherto been continuously rising and depositing new layers on the mud-flats, then fell dramatically, drastically reducing the area of shallow water marginal habitats on which the dinosaurs depended. Even without the other changes, the dinosaurs must have become uncommon because of the drastic loss of suitable habitat.

It was man and the mammals who, although facing difficulties that are revealed by the sudden drops in lifespan recorded in Genesis, survived and prospered after the Cretaceous: the development of more settled terrestrial habitats with forests and savannahs was well suited to mammalian lifestyles.

The dinosaurs, we believe, led a lifestyle well suited to prospering in unstable times on the margins of the rapidly shifting continents. Birds, far from being their supposedly evolutionary descendants, were, in fact, their frequent companions (Figure 12), as they too were able to migrate rapidly and cope with the uncertain ebb and flow of the ever-changing seas. Far from inhabiting a mature and settled world very like our own (as the films and most dinosaur books would have us believe), the dinosaurs lived in an otherwise lonely world on featureless mud-flats, in a very tough and changeable environment.

It is an amazing miracle that in spite of all the instability and violence the Earth has suffered as result of God's judgments on human sin (the Flood and Babel being prominent examples), conditions on Earth always remained stable enough to ensure we are all still here! A cleared woodland today, if left to itself, will regenerate through a predictable series of successions of plants and animals until the woodland is restored. So also, God planned a sequence of habitats with their associated flora and fauna to develop after the Flood and these would smoothly restore the ecology of the Earth after its destruction. A habitat suitable for Man was God's objective, and the 'Age of the Dinosaurs' was just one of the later stages of this process. God never intended a world for the ideal benefit of dinosaurs, so this era had to come to an end, like all the other eras which preceded it. And like those previous eras, the end of the 'Age of the Dinosaurs' came suddenly. From God's standpoint this was predictable and inevitable. For all their immense power (Job 41) the dinosaurs could not withstand God.

But nor is the Earth as we now know it God's ultimate objective. The end of the present age, and the punishment of the ungodly, is, from God's point of view, equally predictable and certain. And it will also be sudden: 'For as the lightning cometh out of the east, and shineth even unto the west; so shall the coming of the Son of man be.' (Matthew 24:27).

References

CURRIE, P. J. (1996). *The Great Dinosaur Egg Hunt. National Geographic,* 189(5):96–111.

Garner, P. (1996). *Where is the Flood/post-Flood Boundary? Implications of Dinosaur Nests in the Mesozoic.* Creation Ex Nihilo Technical Journal, 10(1):101–106.

Garton, M. (1991). *Rocks and Scripture 4.* Origins, 4(11):8–13.

Garton, M. (1996). *The Pattern of Fossil Tracks in the Geological Record.* Creation Ex Nihilo Technical Journal, 10(1):82–100.

Garton, M. (1997). *A Spanish Weekend.* Origins, (22):11–24.

Hitchcock, E. (1836). *Ornithichnology. Description of the footmarks of birds (ornithichnites) on New Red Sandstone in Massachusetts.* American Journal of Science, 29:307–340.

Hitchcock, E. (1844). *Rejoinder to the 'Discovery of fossil footmarks' by J. Deane.* American Journal of Science, 47:390–399.

Hitchcock, E. (1851). *Religion of Geology and its connected Sciences.* Crosby, Nichols, Lee and Co., Boston.

Johnston, R. H. (1997). *The Flood/Post-Flood Boundary. Creation Ex Nihilo Technical Journal,* 11(2):162–165.

Lockley, M. G. (1991). *Tracking Dinosaurs: A New Look at an Ancient World.* Cambridge University Press, Cambridge.

Lockley, M. G. and Hunt, A. P. (1995). *Dinosaur Tracks and other fossil footprints of the western United States.* Columbia University Press, New York.

Lockley, M. G., Yang, S. Y., Masaki Matsukawa, Farley Fleming and Lim, S. K. (1992). *The track record of Mesozoic birds: evidence and implications.* Phil. Trans. R. Soc. Lond. B. 336:113–134.

Morton, G. R. (1982). *Fossil Succession.* Creation Research Society Quarterly, 19:103–111.

Morton, G. R. 1987. *Reply to Woodmorappe's several matters.* Creation Research Society Quarterly, 24:154–156.

Morton, G. R. (1995). *Foundation, Fall and Flood,* DMD Publishing, Dallas, Texas.

Sanz, J. L., Moratalla, J. J., Diaz-Molina, M., Lopez-Martinez, N., Kalin, O. and Vianey-Liaud, M. (1995). *Dinosaur nests at the sea shore.* Nature, 376:731–732.

Scheven, J. (1995). *Unverstandene dinosaurier.* Leben (Kuratorium Lebendige Worwelt), 6:3–11.

Steinbock, R. T. (1989). *Ichnology of the Connecticut Valley: A Vignette of American Science in the Early Nineteenth Century,* in Gillette, D. D. and Lockley, M. G. *Dinosaur Tracks and Traces.* Cambridge University Press, Cambridge.

Tyler, D. J. (1993). *For Dinomania survivors!* Evangelicals Now, (September):3.

Verges, J. and Munoz, J. A. (1990). *Thrust sequences in the southern central Pyrenees.* Bulletin Société Géologique de France, 8 (VI), pp.265–271.

Young, C.-C. (1965). *Fossil eggs from Nanhsiung, Kwantung and Kanchou, Kiansi.* Vertebrata Pal Asiatica, 9:141–170

The Author

Michael Garton, M.Sc., is well-known to regular readers of *Origins* for his excellent series of papers on geology in which he has opened up new thinking about the relationship between this science and biblical interpretation.

Correspondence

Alistair Oliver *(Guildford)*

While interviewing Richard Dawkins about his latest book *Climbing Mount Improbable*, which is another work of his on the 'beauty' of evolution, Melvin Bragg on his 'Start the Week' programme (Radio 4, 9.00 am, 29th April 1996) brought to light some interesting remarks made by Professor Dawkins.

One of the comments that he made I found particularly astonishing. The discussion led to a question about the parallel between biological evolution of life and social evolution. In his reply, Richard Dawkins talked about the natural world being a hostile place, using as an example the African plains where nature is quite literally 'red in tooth and claw.' He went on to say that the natural world is not a nice place and used the phrase 'dog eat dog world.' Then, as he continued his answer, he made a most remarkable statement (in the context of social evolution), '... we need to passionately fight against Darwinian evolution;' and this from a man who 'religiously' believes the theory!

Are we to conclude then, that every possible aspect of evolution, for example, physical and mental, is to be fought by any possible means and that gradual development from a simple to a more complex form is to be resisted as it continues its blind and unrelenting path through time? Or is it just the social aspect of evolution that need be resisted? Can we, as its results and benefactors (?) resist the process anyway, in order that it be slowed, halted or even reversed? Can the biological evolution of humans proceed unhindered if we attempt to suppress social evolution? Are the two not entirely married together?

Perhaps we have hit a raw nerve here. Evolution teaches survival of the fittest, which means that the weak die off. Thus, the death of weak members should not be hindered if society is going to benefit by the advancement of evolution. Charity, compassion, kindness and love directed at these weaker members will impede the process and is a perversion of the process of evolution. (In fact, the very existence of these human characteristics is confusing, not to say disturbing, to the Darwinian evolutionist who cannot account for them at all.)

Evolution is either for the benefit of the human race or it is not. We cannot pick and choose which bits are acceptable to us and which are not. And what moral standards do we apply anyway if we do not have the absolute moral standards given us by God, since anything less is going to be relative? But surely, we are only animals after all, albeit of a higher intelligence than most others aren't we? There is no room for sentimentality.

Richard Dawkins distinguishes between aspects of evolution which are for the good of the human race and those which are not. If that's not having your cake and eating it, I don't know what is. Evolution is sheer barbarism.

The First Great Catastrophe

Implications for a Creationist World-view

J. H. John Peet

As creationists, we continually draw attention to perfect design as a demonstration of the biblical truth about the Creator who made the worlds and all that is in them. He is the One who does all things well. He could look on His creation and say, 'It is very good.' This must mean perfection, harmony, beauty, *etc.* It could not include evil, discord, disfigurement, *etc.* because of God's hatred of these things. Yet, we look around us today and see that all is not well. What has gone wrong? The contrast is the result of the first great catastrophe in Earth's history: the Fall.

Here is the clear difference between the biblical account of origins and the myths of Babylonia and Assyria. If there is any reference to a fall in that literature, it is the fall of the gods, not man. The myths have no point of contact with the biblical account on this issue (Buss, 1980). Here too we see a particular weakness in the theistic evolutionary explanation of origins.

The Nature of the Fall

The description of this event as 'the Fall' is very appropriate and is in complete contrast to evolutionary theory. This latter theory proposes (Figure 1) that man has continually progressed upwards morally and culturally from his original animal state. In contrast, the Bible says that he began at a higher state than the animals, but fell through sin, though still superior to the animals of course.

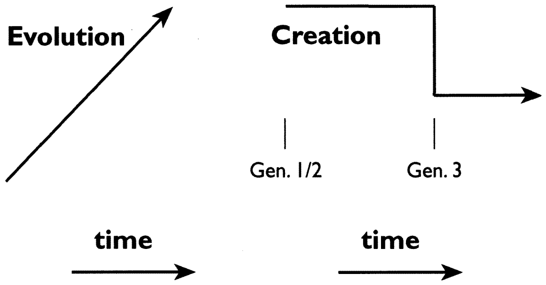


Figure 1

Genesis 3 tells us that darkness entered the scene; the beauty was eclipsed. Chapter 2 speaks of a beautiful harmony: man with the world, with his wife and with his God. We see God walking with man (3:8) in the garden. But chapter 3 begins with 'Now the serpent ...'. The word 'now' implies continuing history. The serpent was real, as demonstrated by the ensuing judgment. The fact that it spoke demonstrates that it had been taken over by Satan. Its words show this because it is God's enemy (reinforced in Revelation 12:9; 20:2). The *Creation Manifesto* published by the *Biblical Creation Society* sums up the key biblical statements on this matter (see particularly sections 1.4.1 and 2.4.1).

What was going on in that garden? There is a scene that we do not see. The problems of Job illustrate this. His counsellors said many good things, but they were frequently irrelevant because they did not know about Job chapter 1. We know about the rebellion of Lucifer (thereafter named Satan) and we see him here in Eden, but we do not know what was going on in the heavenly realm at this time. Clearly there *was* a challenge to God's authority. Satan's words demonstrate this. He gave a direct challenge to God's word ('Did God really say...?') and then a deliberate distortion of it ('You must not eat of any tree...').

But look at man. Satan draws his attention to the fruit. He plants doubts in Eve's, and so Adam's, mind. Then they take it. This is not an evolutionary mistake but deliberate disobedience. 'I'm not having God tell me what to do.' (Compare the cry at the Lord's trial, 'We'll not have this man reigning over us.'). It was an act of arrogance.

Paul makes it plain that this is fact not parable: 'Just as sin entered the world through one man ...' (Romans 5:12). He goes further in demonstrating its true historicity: 'But I am afraid that just as Eve was deceived by the serpent's cunning ...' (2 Corinthians 11:3). He bases his arguments on the roles of man and woman in the church and in the family on the historical nature of the account (1 Timothy 2:13–14).

The devil is doing a good job in making man doubt Genesis 3—after all, he is the Deceiver! Why should God deceive us into thinking it is true if it is not? It would be against His nature; *He* is not the deceiver.

We do not know the nature of the fruit and whether there was anything of itself that would bring about some of the judgments. It is useless to speculate when God has not told us. We are told that the fruit was the 'knowledge of good and evil' (2:17). A comparison of Genesis 2:17, 3:5 and 3:22 shows that, at this point, Satan was speaking the truth. Man has a knowledge of good and evil. Since this cannot be true of God in an experimental way, it must refer to His authority to define good and evil. It is the right to define and set laws to this end. Man wanted this right, which is God's, whereas his true position should have been one of faith, obedience and humility. Man now asserts his right to do so and we see the deviant laws of man in which good has become evil and evil is called good. The expression is also used to describe the law-giving authority of kings (*e.g.* 2 Samuel 14:17; 1 Kings 3:9), as in 'Give Thy servant an understanding heart to judge the people, that I may discern between good and evil.' It also speaks of moral discernment, as is apparent from Deuteronomy 1:39 and Isaiah 7:15–16. For them, the age of innocence had passed. The tragedy is in Satan's half-truth: 'You will become like God.' They already were, being in His image, and now were to be robbed of that relationship!

So, God pronounced His judgments. God fixes the blame where it is due: on Adam. It is to Adam first (3.9) and last (3:17) that the Lord comes. While Eve and the serpent are judged, God makes it plain that Adam has the primary responsibility, 'because you listened ... and ate ...' The most far-reaching natural effects are those given because of Adam's sin.

The Effects of the Fall

The effects of the Fall are summarised in Table 1. The judgments are in three directions: the serpent, Eve and Adam. *The serpent* is cursed, despised above all God's creatures (3:14), not least by man, the woman's seed (3:15). Men and serpents are natural enemies from this point on. This, of course, is also symbolic of the war between God and the Evil One which culminates in Christ, the offspring of the woman, who has ultimate victory over Satan (1 Corinthians 15:25). The church too is to share in this victory (Romans 16:20). The real events of Eden form the basis for the symbolism of the heavenly battle in which Satan is described as the serpent (Revelation 12:9; 20:2). In the earthly realm, the judgment against the serpent is described by condemning it to crawl on its belly and to eat the very dust from which man was taken and will return. The former judgment implies that the creature underwent an anatomical change. (A fossilized snake has been reported as having two hind legs, one inch long. It is interesting, though not necessarily relevant, to consider this as related to this judgment (Anon, 1997a; Caldwell and Lee, 1997)).

The curse of the Fall affected
- the serpent
- the man
- the woman
- the environment

Table 1 : The effects of the Fall

The woman, Eve, is judged for her part in the disobedience and in causing Adam's fall. In the first place, her childbearing would be painful. At the height of her fulfilment as a woman, she would be reminded of the pain of disobedience, of her rebellion against God. Her relationship with her husband is spoilt. The wording is difficult to interpret, but a comparison of 3:16 with 4:7 suggests that the meaning is that she will seek mastery over her husband, but she will not succeed. Alternatively, we may understand this to refer to the pain of childbirth: she would suffer this pain, but her sexual desire towards her husband would be such that she would be unable to escape this curse (Payne, 1962). (*N.B.* this should not be seen as implying that sexual desire is wrong; that would be misreading this verse and the preceding passages). Here is the beginning of the battle of the sexes, in contrast to the mutual support (2:21–25) that God had intended. Love has become lust. Care has become dominance. Openness has become embarrassment (2:25; 3:7). We see man pointing the accusing finger instead of holding her hand or protecting her under his arm.

Sin affects ...
- man's relationship with his God
- man's relationship with himself
- man's relationship with his wife
- man's relationship with nature
- man's relationship with his offspring

Table 2 : The effects of sin

But the ultimate punishment is on *the man* (Table 2). In 2:17, God had warned man that his punishment would be death: '... in dying, you shall die ...'. At the moment of eating, the process of death and decay will begin. While there is a spiritual dimension to this (Ephesians 2:1), God is speaking very plainly: the punishment will involve physical death (3:19). This verse has no meaning (and would be misleading) if it did not mean that physical death came upon Adam because of this act. No explanation of origins that ignores this plain statement or contradicts it can be true.

Sin spreads like a contagious disease. Paul tells us that 'sin entered the world through one man' and so 'death came to all men' (Romans 5:12). We want the best for our children—but Adam passed on a death sentence. He saw one son murder another. He saw eight generations as they slipped into grosser sin.

The judgment of man reaches further. *The environment* had been created for man's pleasure. Day by day, as he wandered through Eden, he would declare, to quote a modern hymn, 'How great Thou art!' Now, that same environment was to be spoilt so that he would toil and prick his fingers and be reminded, 'How great is my sin.' The animals which had been subject to his word would now rebel against his lordship just as man had rebelled against God's.

Paul picks up on this in Romans 8:18–25. Paul says that not only man, but the whole creation is groaning under the judgment to which it has been condemned and its looking forward to its redemption. The creation, says Paul, has been subjected to 'frustration' and will be liberated from its bondage to decay. It is difficult to see how this can be understood as meaning anything but the judgment of the Fall.

Unique in posture	Stands upright; Is bipedal; Has unique orientation of skull to spinal column to enable forward view; Has unique position of hip joint; Has opposable pollex.
Unique in intelligence	Accumulates knowledge; Able to count to high numbers; Possesses mathematical ability; Is capable of complex reasoning and abstract thought; Engages in lateral thinking; Develops theories; Judges; Plans.
Unique in creativity	Designs, constructs and uses tools; Designs and builds complex structures; Has artistic ability (art, music, literature, *etc.*).
Unique in communication	Uses many languages; Uses a variety of means of communication (words—prose and poetry—music, laughter, body language, *etc.*); Has unique sense of family relationships and loyalty.
Unique in lordship	Is endowed with authority to manage and care for natural order, both fauna and flora.
Unique in morality	Has an appreciation of good and evil; Possesses a conscience; Recognises an ethical responsibility; Has respect for life; Possesses a spiritual dimension; Has powers of awe, worship and self-sacrifice; Has a morality which is able to overcome environmental circumstances.

Table 3 : The uniqueness of man

There is much we do not know about the detail here. The process of dying—how did that originate? Clearly from the New Testament (Revelation 21:4), we can conclude that sickness and disease were the direct result. Did good bacteria become harmful? Were viruses already in existence but man was now susceptible to their attack? Were the roses and fruit bushes previously thornless and a mutation brought about the change or, maybe, the genes for thorns were suppressed until this moment? The number of questions we have are extensive, but God has not chosen to reveal the answers (though some *may* become apparent through genetic research). The effects, though, are unambiguous.

Of special significance though is man's relationship with his Maker. He is created in a unique way and to a unique design. The LORD made him directly from the soil (2:7 ; note, not from other living creatures) and after His own image and likeness (Peet, 1989). The uniqueness of man is demonstrated in many ways (Table 3). These are so diverse and fundamental that, even in fallen man, we can see this image displayed (Genesis 9:6; James 3:9). Many of the features which can be understood as arising from this relationship have been spoilt by sin. So, for example, his lordship over creation (1:26) is still real (Psalm 8:6), but it is no longer absolute. The animals can and do rebel; the ground does frustrate his efforts.

Man is a ruler and acts with purpose. But he exchanged God's will for his own and so is now under the dominion of sin and a slave to corruption (2 Peter 2:19). He needs restoration and a renewed will.

Because man was made in the image of God, he has knowledge and so a rational mind and can think. But he exchanges God's truth for a lie. His mind is set against truth and has his understanding darkened (Ephesians 4:18). Always learning, he never comes to the truth (2 Timothy 3:7). His judgments are flawed and must always be measured against divine revelation. As Peter makes clear, the missing knowledge (in which the Christian must grow) is that of our Lord Jesus (2 Peter 1:3; 3:18). He needs revelation and a renewed mind.

Because he is made in the image of God, he was made in righteousness and so is a moral being. He has exchanged God's inbuilt character and his desires are set against right (Romans 3:10) and he seeks to establish his own righteousness (Romans 10:3). He needs reconciliation and renewed desires.

Like Adam (3:8), we are hiding from God. We are aliens not friends. We are alienated from God because of our desire to be gods. He who is God, *was* our friend. *Now* He is our enemy (Romans 5:10). Man fights against God and resists Him. The separation is forcefully demonstrated by the cherubim guard to the entrance of Eden.

At the moment of his sin, 'man lost all his spirituality that linked him in loving friendship with his Maker' (Breed, 1968). Not only did he forfeit his right to unfettered communion with his God, but we find in him 'a persistent tendency to sin and rebellion against the divine will' (Hammond, 1956). Breed continues, 'Instead of all his powers and abilities going out to God in love and service, they are now self-centred.' In Genesis 8:21, the LORD alludes to the Fall and its judgment. He links the curse on the ground and the total depravity of the human heart.

The image was shattered by the loss of the glory of God (Romans 3:23). This aspect of the image is being renewed in us daily as Christians (Romans 8:28–29). As with the other attributes, it will be perfected again at the final resurrection.

The record of the Fall ends with a final judgment: man's banishment from the garden of Eden and so from the Tree of Life (3:22–24). This tells us that the garden was a specific location within the created earth (*cf.* 2:8) for them to enjoy. We do not know how it was related to the rest of the world, but it was obviously special in a special creation (just as planet Earth is in the universe). This may also indicate that there was a selected range of animals in the garden and it is these that Adam named on the sixth day (Q and A, 1997). What happened to this garden between the Fall and the Flood we do not know. Nor can we find it today (Anon, 1997b). The restoration is, of course, a theme of the final chapters in the Bible (Revelation 22:1–5).

The effects of the Fall are seen to be far-reaching affecting man and his environment. How far, then, may man seek to mitigate the effects of God's judgment?

Overcoming the effects of the Fall

God has acted in judgment. Are we overriding God's sovereignty by seeking to minimise its effects? A good way of evaluating the principle is to look to the Bible for examples. One effect of sin is sickness, yet we have many examples of healing throughout the Old and New Testaments. Even death is overcome, at least temporarily in several examples. But, though we see the effects minimised, the healings never overcame the ultimate effect. Those who were raised to life, except our dear Lord, died again and permanently.

The Lord gave thorns and thistles in judgment to make gardening hard but not impossible. Our loss of ultimate control over the animals does not prevent David and Samson fighting and defeating them. Even our fight against the effects of sin reminds us of God's anger against it. Those effects of the Fall which cannot be ameliorated by man are those which God alone holds the power to deal with. For example, He alone can remove the presence, guilt and power of sin.

The ultimate chrtistian activity that seeks to overcome the effects of the Fall is, of course, evangelism. This is the proclamation of the gospel that God has dealt with the guilt and punishment of our sin in Christ. We are to get out into the world to call on men and women to repent and seek God's forgiveness.

Through the processes of science, some of the effects of sin can be minimised. Unfortunately, of course, scientific endeavour is tainted by sin and may cause greater calamity rather than less on occasions.

Conclusion

The created world has become spoilt. We can still see God's handiwork: some in beauty, some in judgment. God has given us the means to deal with some of the symptoms and results of sin, but the ultimate judgment is in His hands: either at the Cross or at the end of the world. To understand the world and interpret the past, as well as the present, we must recognize the work of the Creator in both creation and judgment.

References

ANON (1997a). *Legged Snakes Identified.* Biblical Archæology Review, 23(4):17.
ANON (1997b). *Where's Eden?* Origins, (22):27.
BREED, C. (1968). *Lectures in Christian Doctrine.* Strict and Particular Baptist Ministers' Fellowship, Epsom. p.28.
BUSS, M. C. (1980). *The Hebrew and Babylonian Creation Narratives.* Biblical Creation, 2(7):12.
CALDWELL, M. W. and LEE, M. S. Y. (1997). *A Snake with legs from the marine Cretaceous of the Middle East.* Nature, 386(6626):705–709.
HAMMOND, T. C. (1956). *In Understanding be Men.* Inter-varsity Fellowship, London. p.79.
PAYNE, J. B. (1962). *The Theology of the Older Testament.* Zondervan Publishing House, Grand Rapids. p.219.
PEET, J. H. J. (1989). *Man—the Image of God.* Origins, 3(7):8–11.
Q and A (1997). Origins, (23):31.

THE AUTHOR

John Peet is the travelling secretary for *BCS* and a member of the editorial board. He is a chemistry graduate who researched in organometallic chemistry and lectured in chemistry at all levels up to further and higher education. John has interests in creation and biblical chronology issues, as well as in ministering from the whole Word of God.

UPDATE

Further to the correspondence on chronology, interested readers may like to refer to a paper (in two parts) by M. Christine Tetley, *The Genealogy of Samuel the Levite* in *Buried History,* 1997, 33(1):20–30 and 33(2):39–51. She shows that the genealogical tree for Samuel from the Exodus to the monarchy may have been misread and so be shorter than generally understood.

We are now registered with

CAF CharityCard™

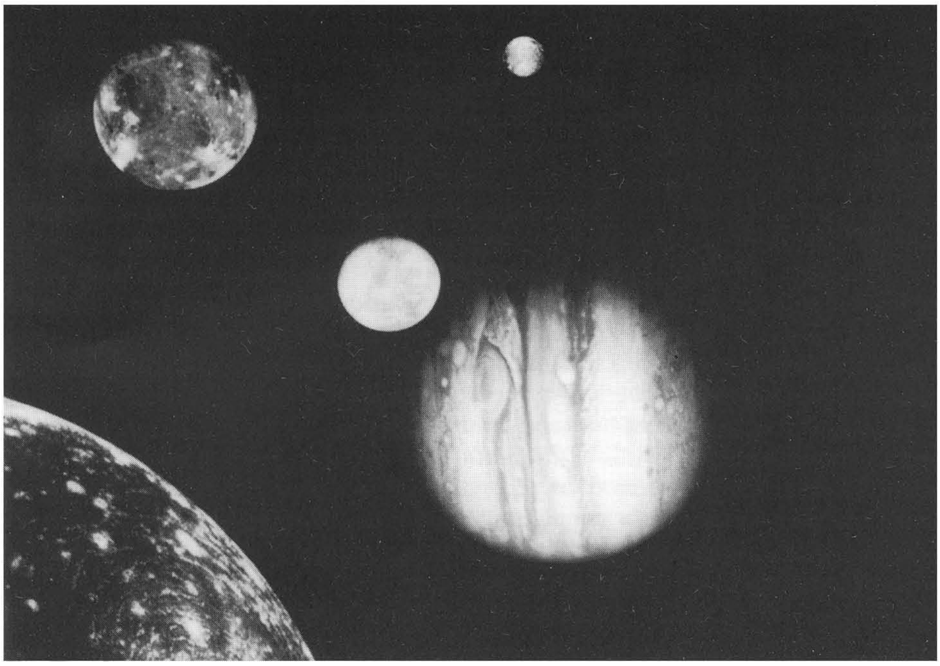
So you can make donations through the CharityCard system.

Our Administrative Officer would be happy to advise you.

News of Creation

The Puzzling Moons of Jupiter: Evidence for Recent Creation from the Galileo Probe

THE FOUR largest of Jupiter's moons—Io, Europa, Ganymede, and Callisto—have been in the news recently as a result of new images and data transmitted from the Galileo spacecraft. Despite their close proximity to one another, in orbit around Jupiter, these moons are turning out to be remarkably different worlds. The Galileo mission is also providing creationists with further evidence of the relative youth of our solar system (less than 10,000 years) compared with the evolutionary estimate of its age (4.5 billion years).



Jupiter (centre), with its moons (left to rightO Callisto, Europa, Ganymede and Io

In December 1995 the Galileo probe flew within 890 km of Io and took its first photographs in June 1996. The Voyager 1 mission in 1979 had already revealed Io to be one of the few volcanically active places in the solar system besides the Earth. Galileo confirmed this, revealing that one volcano called Ra Patera had been particularly active. Debris from the volcano has blanketed a region the size of England, with one new lava flow covering an area the size of Yorkshire (Spencer, 1997 p.44). Obviously, volcanic activity requires a heat source, but Io is a relatively small body and should have cooled completely if it is really billions of years old. For this reason, most scientists believe that Io is internally heated by the tidal forces acting on it from Jupiter and the other moons. If tidal heating is the source of Io's vulcanism then the problem of keeping Io hot for billions of years is overcome. However, according to the theory of tidal heating, the most active regions should be the poles, but most of Io's active volcanoes are within 30 degrees of the equator. Furthermore, the crust at the poles should be the thinnest and unable to support much weight. Yet it is only at the poles that prominent mountains are seen. These problems with the tidal heating model indicate that Io may simply be cooling from an initially hot state. If so, Io must be much younger than conventional science admits (Steidl, 1983 p.89).

Europa is one of the strangest bodies in the solar system. It has a smooth, bright surface made of water ice and is almost entirely free of impact craters. It has been suggested that movement of the ice has wiped out any evidence of craters that Europa once had. That Europa must once have had craters is a prediction of the evolutionary accretion model for the origin of the solar system. If the accretion model is correct, then Europa, like every other body in the solar system, must have suffered intense meteoritic bombardment early in its history. However, an alternative hypothesis is that Europa did not form by accretion but was created just as it is. Europa really made headlines when NASA scientists suggested that oceans of water under the ice—for which the Galileo mission provided fresh evidence—may host life. Evidence of an internal heat source also led some scientists to speculate that the oceans may contain volcanic hydrothermal vents, similar to those known on Earth and thought by some to be sites where the first living organisms evolved. The circular argument here should be apparent. To quote the *BCS* President, Edgar Andrews, in a recent edition of *Evangelical Times*:

'When stripped bare, the reasoning goes as follows:

1. Life arose accidentally on Earth by random chemical reaction.
2. This occurred in seas of liquid water.
3. There is liquid water on Europa.
4. Therefore, life must have arisen on Europa.
5. The existence of life on Europa substantiates the claim that life evolves by chance wherever the conditions are right.
6. Therefore life on Earth arose by chance, not by creation.'

As Edgar points out, 'The bankruptcy of such logic is plain. It begins with an assumption of evolution and proceeds to "prove" that evolution happened' (Andrews, 1997). By way of an aside here, it is worth noting that a recent study published in *Nature* indicates that the carbonates in the Mars meteorite ALH84001, which hit the front pages last year over claims that it contained fossilized bacteria, could not have formed at low temperatures but were crystallized from shock-melted material. According to the authors (Scott *et al.*, 1997 p.377), 'this conclusion weakens significantly the arguments that these carbonates could host the fossilized remnants of biogenic activity' (*i.e.* life).

The other two Jovian moons we are considering—Ganymede and Callisto—are also the largest. One of the most remarkable discoveries by the Galileo spacecraft is that Ganymede has a magnetic field of its own, and a substantial one at that (Gurnett *et al.*, 1996; Kivelson *et al.*, 1996; Schubert *et al.*, 1996). At Ganymede's surface, the field is about one-tenth as strong as Earth's—and larger than the magnetic fields of Mercury, Mars, Venus, or the Moon (Stevenson, 1996). This has confounded the scientists, who are finding it difficult to explain how Ganymede has retained its magnetic field for billions of years. The problem is exacerbated by the fact that neighbouring Callisto does not have its own internally generated magnetic field (Gurnett *et al.*, 1997; Khurana *et al.*, 1997). Why are the two moons so different in this respect? According to conventional theory, planetary magnetic fields are generated by the circulation of electrically conducting material in the planetary interior. The problem is that it is not clear where the heat to produce this movement could come from in Ganymede's case. Ganymede is further away from Jupiter than Io or Europa, so it experiences even less tidal heating than those bodies. Some scientists have suggested that in the past Ganymede may have been temporarily forced into a more elliptical orbit by the gravitational pull of the other moons. This would have brought it closer to Jupiter and resulted in stronger tidal heating than today. Thus, 'Ganymede's thermal evolution clock may have been reset so that it now behaves like a body that is merely a billion years old rather than its true age of 4.5 billion years' (Stevenson, 1996 p.512). However this is an *ad hoc* speculation, without any supporting evidence, intended solely to preserve the great age of Ganymede demanded by conventional theory. Alternatively, of course, Ganymede could be much younger than conventional science can allow.

These findings teach us that, as Christians, we have nothing to fear from the exploration of our universe. On the contrary, we have good reason to rejoice as more of God's glory is revealed in the heavens (Psalm 19) and His infallible Word is confirmed by the latest discoveries in our solar system. *Paul Garner.*

References

Andrews, E. (1997). *Jupiter moonies?* Evangelical Times, (May):11.

Gurnett, D. A., Kurth, W. S., Roux, A., Bolton, S. J. and Kennel, C. F. (1996). *Evidence for a magnetosphere at Ganymede from plasma-wave observations by the Galileo spacecraft.* Nature, 384:535–537.

Gurnett, D. A., Kurth, W. S., Roux, A. and Bolton, S. J. (1997). *Absence of a magnetic-field signature in plasma-wave observations at Callisto.* Nature, 387:261–262.

Khurana, K. K., Kivelson, M. G., Russell, C. T., Walker, R. J. and Southwood, D. J. (1997). *Absence of an internal magnetic field at Callisto.* Nature, 387:262–264.

Kivelson, M. G., Khurana, K. K., Russell, C. T., Walker, R. J., Warnecke, J., Coroniti, F. V., Polanskey, C., Southwood, D. J. and Schubert, G. (1996). *Discovery of Ganymede's magnetic field by the Galileo spacecraft.* Nature, 384:537–541.

Schubert, G., Zhang, K., Kivelson, M. G. and Anderson, J. D. (1996). *The magnetic field and internal structure of Ganymede.* Nature, 384:544–545.

Scott, E. R. D., Yamaguchi, A. and Krot, A. N. (1997). *Petrological evidence for shock melting of carbonates in the martian meteorite ALH84001.* Nature, 387:377–379.

Spencer, J. (1997). *Jupiter's odd bunch.* New Scientist, 154(2076):42–45.

Steidl, P. M. (1983). *Planets, comets, and asteroids*, in: Mulfinger, G., editor, *Design and origins in astronomy.* Creation Research Society Books, Terre Haute. pp.73–106.

Stevenson, D. J. (1996). *When Galileo met Ganymede.* Nature, 384:511–512.

Was there a Late Precambrian Ice Age? The Implications of new Palæomagnetic Data

CONVENTIONAL reconstructions of climate throughout the geological past indicate that the Earth has fluctuated between 'green-house' and 'ice-house' conditions over at least the last 800 million years[1]. During 'ice-house' periods the Earth is thought to have developed extensive ice sheets that left a record of their presence as ancient glacial deposits and landforms. During 'green-house' periods the Earth is thought to have been free of ice and enjoying a period of relative global warmth. Geologists recognize four major 'ice-house' episodes: the Proterozoic, the Late Ordovician to Early Silurian, the Early Carboniferous to Late Permian, and the Early Cenozoic to the present day (Doyle *et al.*, 1994 pp.145–158). Young-earth creationists accept the powerful evidence in favour of a glacial period during the Cenozoic (Coffin, 1983 pp.198–202; Northrup, 1986), regarding it as a relatively rapid post-Flood event. However, it is difficult to see how a series of earlier ice ages could be accommodated within the short creationist time scale for the deposition of the geological column. Consequently, creationists have questioned whether the evidence for the earlier ice ages is as strong as that for the Cenozoic, or whether alternative interpretations of the data are possible (Molen, 1990; Oard, 1994; Oard, 1997). A recent study published in *Nature* has reinforced creationist misgivings about one of these postulated ice ages—that in the Proterozoic (Evans *et al.*, 1997).

The view that the Earth experienced a severe ice age during the Proterozoic is supported by widespread diamictites in sedimentary sequences of that age. Diamictites, also referred to as 'mixtites' or 'tillites,' are layers of unsorted boulders set in a finer-grained sediment matrix, and are usually thought to have been glacially deposited. The glacial interpretation of these sediments is clearly a challenge to creationist reconstructions of Earth history, particularly those in which a substantial part of the Precambrian was laid down during the Flood. However, the Proterozoic diamictites are also problematic for conventional models of Earth history in that they are characteristically associated with limestones, which are usually thought to have formed in warm tropical seas. Limestones have been found above, below, and within diamictites (Schermerhorn, 1974 p.692). To resolve this enigma it has been suggested that at least some ancient limestones may have formed in cold water at high latitudes. However, some of the diamictites are also associated with other indicators of low latitude such as red beds and evaporites (*e.g.*, Hambrey and Harland, 1981). Furthermore, some rocks interbedded with the diamictites, such as lavas, contain magnetic minerals that preserve a record of the Earth's magnetism at the time they were formed. It is sometimes possible to determine the latitude at which the rock was formed from such data (Rouse, 1983). Palæomagnetic analysis of several Late Proterozoic (or Neoproterozoic) sequences confirms that they were formed at low latitudes. Frakes (1979 p.90) states, 'palæomagnetic investigations have already shown, rather startlingly, that an abundance of Late Precambrian glacial strata were deposited in relatively low palæolatitudes.'

Until recently, however, similar palæomagnetic data for older diamictites in the Palæoproterozoic had not been obtained, as such deposits were often too poorly preserved and/or suffered from secondary magnetic overprinting. However, the new study by Evans *et al.* (1997) presents the first direct and reliable palæomagnetic estimates from Palæoproterozoic 'glacial' deposits. The marine 'Transvaal Supergroup' on the Kaapvaal craton in South Africa straddles the Archæan-Proterozoic boundary. Within the supergroup is a regionally extensive, largely undeformed and unmetamorphosed succession of volcanic rocks called the Ongeluk lavas. These lavas, with a conventional radiometric (Pb/Pb) date of about 2.2 billion years, conformably overlie the Makganyene diamictite—there is no significant hiatus between the two units (Kaufman, 1997). Palæomagnetic determinations of the lavas, and hence the diamictite, by Evans *et al.* indicate a depositional latitude of 11 ± 5° The authors conclude, 'The low palæolatitude of the Makganyene diamictite compounds the enigma of Precambrian glaciations ... It is now documented that both of the broad intervals of Precambrian glaciation, near the beginning and end of the Proterozoic æon, include glaciogenic sediments deposited in equatorial latitudes' (p.266).

For conventional geology, the palæoclimatic enigma of tropical glaciation is deepened. Sceptics might justifiably conclude that their doubts about the glacial interpretation of the Proterozoic diamictites have been vindicated. The onus now rests with the sceptics to develop an alternative model for the origin for these sediments. If the diamictites are not glacial, then how did they form? Already, much work has been done to answer this question. Both creationists (Molen, 1990; Oard, 1994; Oard, 1997) and non-creationists (Schermerhorn, 1974) have pointed out that non-glacial sedimentary processes can mimic supposedly diagnostic glacial features (unsorted boulder beds, striated and faceted clasts, striated pavements, dropstones, *etc.*) and have argued that the Proterozoic diamictites were actually laid down by catastrophic underwater mass-flows and not by ice sheets. The interested reader is directed to Michael Oard's new monograph on this subject, *Ancient ice ages or gigantic submarine landslides?*, for further details.

Paul Garner.

Footnote

1. Palæoclimatic reconstructions prior to 800 million years are regarded as much less certain.

References

COFFIN, H. G. (1983). *Origin by Design.* Review and Herald, Hagerstown.

DOYLE, P., BENNETT, M. R. and BAXTER, A. N. (1994). *The key to Earth history: an introduction to stratigraphy.* John Wiley, Chichester.

EVANS, D. A., BEUKES, N. J. and KIRSCHVINK, J. L. (1997). *Low-latitude glaciation in the Palæoproterozoic era.* Nature, 386:262–6.

FRAKES, L. A. (1979). *Climates throughout geological time.* Elsevier, New York.

HAMBREY, M. J. and HARLAND, W. B. (1981). *Earth's pre-Pleistocene glacial record.* Cambridge University Press, Cambridge.

KAUFMAN, A. J. (1997). *An ice age in the tropics.* Nature, 386:227–8.

MOLEN, M. (1990). *Diamictites: ice-ages or gravity flows?* in: WALSH, R. E. and BROOKS, C. L., editors, *Proceedings of the Second International Conference on Creationism,* Volume II. Creation Science Fellowship, Pittsburgh. pp.177–190.

NORTHRUP, B. E. (1986). *There really was an ice age,* in: *Proceedings of the First International Conference on Creationism,* Volume I. Creation Science Fellowship, Pittsburgh. pp.93–100.

OARD, M. J. (1994). *Submarine mass-flow deposition of pre-Pleistocene 'ice age' deposits,* in: WALSH, R. E., editor, *Proceedings of the Third International Conference on Creationism.* Creation Science Fellowship, Pittsburgh. pp.407–418.

OARD, M. J. (1997). *Ancient ice ages or gigantic submarine landslides?* Creation Research Society Books.

ROUSE, I. E. (1983). *Paleomagnetism II.* Origins (Geoscience Research Institute), 10:66–89.

SCHERMERHORN, L. J. G. (1974). *Late Precambrian mixtites: glacial and/or nonglacial?* American Journal of Science, 274:673–824.

internet surfers
Visit us
on our Web site:
http://www.pages.org/uk/org/bcs/

Reviews

Darwin's Black Box: the biochemical challenge to evolution, by Michael J. Behe. Free Press, New York. 1996. 307 pp. ISBN 0–684–82754–9.

Reviewed by J. H. John Peet.

IN the last few years there have been several significant books on the subject of Darwin's evolutionary theory of the origin and development of life. These include Michael Denton's *Evolution: A theory in crisis*, Phillip E. Johnson's *Darwin on Trial* and now Michael Behe's work. The effect of these books has been increasingly disconcerting to the Darwinists.

This book faces the challenge set by Darwin himself:

> 'If it could be demonstrated that any complex organ existed which could not possibly have formed by numerous, successive, slight modifications, my theory would absolutely break down.'

Often scientists use complex instrumentation to take measurements, but the contents and workings of the 'black box' is a mystery to them. As Behe says, biochemistry was Darwin's black box, as it is to many evolutionary biologists. The book has had a tremendous impact in the USA, its many reviewers admitting that it is factually reliable. One reviewer, James Shreeve, summed up Behe's thesis as 'When examined with the powerful tools of modern biology, but not with its modern prejudices, life on a biochemical level can be a product … only of intelligent design.' Shreeve adds, 'Coming from a practising scientist … this proposition is close to heretical.' But it is being taken seriously by the establishment. However, they take refuge in the time factor: perhaps in fifty years time we will have an explanation. That sounds like Darwin's same hope concerning the fossil record a century ago. He expected the fossil evidence to become clearer; it has not.

Behe takes a chapter to review the biochemical textbooks and research literature and finds a virtual silence on the evolutionary issues he covers. '*None* of the papers published in [the *Journal of Molecular Evolution*] … has ever proposed a detailed model by which a complex biochemical system might have been produced in a gradual, step-by-step Darwinian fashion.' (p.176, his emphasis).

Inevitably, the science covered is difficult, but the author handles it in a less threatening manner. He uses familiar objects, cartoons or experiences to help the reader picture the argument. The technical sections are kept brief and stripped of the more complicated chemical names. There is an appendix on the biochemistry of life for the general reader.

The examples described by Behe are a small selection of a wide range of possibilities. They demonstrate what he describes as 'irreducible complexity' (p.39). These fall into two kinds: highly integrated systems in which every part had to be present from the start for the system to function and cascade systems which comprise many components which depend on each other and which, alone, would have no biochemical advantage. As an illustration of the former, Behe uses the mousetrap as an illustration. All five parts must be in place for it to function. The wood base would not catch a mouse or offer any improvement. The hammer has no conceivable function until the whole trap is present and set.

The biological systems described by Behe include the eye (chapter 1), bombardier beetle (chapter 2), bacterial movement (chapter 3), blood-clotting cascade (chapter 4), protein transport (chapter 5), the immune system (chapter 6) and ATP synthesis (chapter 7).

Each is worth a review in its own right, but we will limit ourselves to a few examples. The eye was a problem to Darwin, but he and others over the years (down to Dawkins today) have tried to show that stepwise changes to its morphology can be explained and serve as an adequate interpretation of its evolution. Recently much has been made of a computer simulation (note, *not* biological experiments) which transform a three-layered flat photosensitive system into a shape similar to the modern human eye. It requires a couple of thousand 'beneficial' computerised mutations which have no genetic parallel. It fails to explain the origin of the photosensitive layer or the brain's role in sight. Behe takes the problem a stage further by examining the biochemical processes that are 'staggeringly complicated' (p.22).

As an example of bacterial movement, the author describes the rotating arm, the flagellum. The diagram of the bacterial motor that powers this motion (p.71) leaves one gasping at the amazing miniaturisation of a complex machine. As he shows (p.192), the genetic blue-print of this structure had to be in place from the beginning of the bacterium's existence.

The process of blood-clotting is an example of a cascade system and one that is critical to life. When the skin is damaged, we bleed. If this is uncontrolled, we would bleed to death. An enzyme, thrombin, is needed to enable fibrinogen to form the clot that seals the wound. Of course, if thrombin had free reign, it would lead to extensive coagulation and thickening of the blood. It is, therefore, held in an inactive form, prothrombin, until required. Another enzyme triggers the conversion of prothrombin to thrombin at the right moment. But this too is held in an inactive state until required. There is a series of similar inactive/active materials, the first being triggered by the wound itself. Then, of course, we need a 'switch' to terminate the process! The complexity of the system is mind-boggling.

Warfarin is used to kill rats. It does this by displacing vitamin K in the blood-clotting system and so upsets the cascade and causes the animal to bleed to death. Some rats are immune to warfarin, but they are not advantaged by this. They have a deficient enzyme. This mutant enzyme is unable to react with the vitamin. Of course, this mutant enzyme also upsets the cascade and prevents clotting and so the rat dies of internal bleeding anyway!

Behe looks at a number of 'origin of life' experiments and shows their irrelevance (p.149–150). In recent years, much publicity has been given to an 'RNA world' which postulates how living organisms could have developed from a primitive RNA system. As Behe says, this theory 'ignores known chemistry' (p.171).

Michael Behe believes in a common descent (p.176) of the living world and is not a creationist. Yet his conclusion is that 'the complex systems were designed—purposely arranged by an intelligent agent' (New York Times, October 29, 1996; see also p.192*ff*). He says, 'We can be as confident of our conclusion for these cases as we are of the conclusion that a mousetrap was designed.' (p.204). To Behe, intelligent design does not exclude microevolutionary processes (p.229), but evolutionary theory is, of itself, an inadequate explanation of living things. 'A rigorous theory of intelligent design will be a useful tool for the advancement of science in an area that has been moribund for decades.' (p.231).

Dr. Behe says that the purpose of his book is to show that the Darwinian theory of molecular evolution does not work. This he succeeds in doing. In a conference on design in nature last year, theistic evolutionists derided creationist attempts to put intelligent design back on the agenda. Behe shows that it is an inescapable conclusion. It is not light reading, but it is stimulating. This book is essential reading to any who want an honest, authoritative and accurate assessment of the subject.

And God Said ... Science Confirms the Authority of the Bible, by Farid Abou-Rahme. John Ritchie Limited, Kilmarnock. 1997. 136pp.

Reviewed by Paul Garner

THIS book, written by a civil engineer with a Ph.D. degree from Sheffield University, covers a tremendous amount of ground in a short space. Such diverse topics as the Big Bang, the origin of life, mutations, fossil man, and radiometric dating are covered from a young-earth, six-day creation perspective. The author shows a commendable commitment to an infallible and inerrant Scripture, and is obviously keen to present the claims of the gospel to his readers.

However, if I am perfectly honest, I would be deeply uneasy about recommending this book. It does not develop any fresh ideas or concepts, it does not break new ground, and it does not bring to a lay readership any material that was not already available in a popular form. The book is easily digestible, but this is its weakness rather than its strength. It is not meaty enough for Christians already familiar with the subject, and sceptics are unlikely to be convinced by its light coverage. Furthermore, the author's rhetoric is, in my opinion, unnecessarily abrasive at times, and this may grate with some readers. There are a few minor typographical errors, such as the misspellings of Dr. Steven Austin's name as 'Austen' on page 63 and the Leakey family as 'Leaky' on pages 70–71. More serious, however, are the instances where the author appeals to dubious scientific arguments, some of which creationists should long since have abandoned.

For example, on page 66 the accumulation of lunar dust is cited in support of a young moon, but no mention is made of the detailed re-evaluation of the data by Snelling and Rush (1993) which concluded that creationists should not continue to use this argument. It is also disconcerting to see the author perpetuating the claims about human footprints alongside those of dinosaurs in the Paluxy River bed in Texas. He writes, 'There have been attempts by evolutionists to discredit this finding because of its significance, by claiming that the evidence has been tampered with' (pp.57–58). However, one of the earliest published reports sceptical about the 'mantracks' was by a creationist, Berney Neufeld, in 1975. Furthermore, although some evolutionists have suggested that the evidence has been tampered with (and, to be frank, some of the 'prints' do show evidence of forgery by carving (Milne and Schafersman, 1983)), the more significant finding is that some of the so-called 'mantracks' are actually prints of three-toed dinosaurs walking in a plantigrade fashion with their 'heels' touching the muddy substrate (Hastings, 1987). Also repeated are claims that a fossil human tooth and a petrified human finger have been found at the Paluxy site (p.106). The 'human' tooth is indisputably a pycnodont fish tooth, as confirmed by creationist Dr. David Menton of the Department of Anatomy at Washington University (Hastings, 1995). Dr. Abou-Rahme also briefly mentions human footprints alongside trilobites (p.83), probably a reference to the Cambrian 'shoe print' found by William Meister in 1968. This 'print' is almost certainly a natural spall or break in the rock along a plane of weakness and not a genuine track (Stokes, 1986).

Other questionable claims include the author's statement that 'Nebraska Man'—revealed to be a pig's tooth—is still being taught in textbooks today as the missing link (p.70), that there are no indisputable Precambrian fossils (p.56), that sickle cell anæmia is the only example of a beneficial mutation cited by evolutionists (p.53), and that the geological column does not exist (pp.58, 106). The claim about '300 million year old' Russian coals that were re-dated by the radiocarbon method to 1,680 years (p.64) resulted from a mistranslation of the original published report. The so-called 'coals' were actually charcoal samples from an archæological site (Aardsma, 1994). The fact that the shells of living freshwater snails have yielded radiocarbon 'dates' of many thousands of years (p.64) cannot be used as evidence against the method. This phenomenon—'the reservoir effect'—is well understood (Aardsma, 1989). Freshwater shellfish obtain the carbon atoms for building their shells from the water in which they live. If the water is in contact with limestone then it will contain carbon atoms derived from the limestone. Since limestone contains very little radiocarbon, then the shellfish will contain less radiocarbon—and hence have an artificially older 'age'—than would have been the case if they had obtained their carbon from the air.

Creationists often point out the way in which some evolutionists cling to arguments, such as embryonic recapitulation, long after they have been discredited. As followers of Christ who is the way, the truth, and the life (John 14:6), we have a weighty responsibility to make sure that we do not fall into the same trap ourselves.

For references see page 32, column 2

Some Questions to Ponder

WHEN we are considering the biblical perspective on the subject of origins, there are a number of questions to face. Here is a first selection; we may give some more at a later date. Some of these questions have been tackled recently, others will be picked up in future issues. These are provided as a stimulus to your Bible study on the subject.

1. The Creation record speaks of God declaring His work as 'good' and, ultimately, 'very good'. Use the rest of Scripture to identify what God describes as good and compare it with the proposals of evolutionary theory.
2. We tend to think of work as an unwelcome intrusion into life. What is the biblical view of work before the Fall and after it?
3. The concept of design is an important one in that we can see that observable features of 'integrated design' or 'irreducible complexity' are consistent with the Genesis record. What do we make of the concept of design in defence and similar mechanisms?
4. Read again the Flood account. How could God have said more plainly than He has that it was universal in extent? From the record, at what stage was land life destroyed? What is the significance of the fact that God said He would 'destroy all life'? (In the latter case, you will need to investigate the meaning of the word in the original).
5. What is the relationship, if any, between the Creation record and the geological record? Many try to interpret Genesis 1 in the light of the observable geology, but are they talking about the same thing? (Analyse what each is saying).
6. Look back at Genesis 4 and investigate when technology and other skills developed.
7. If we believe that the whole of man is affected by the Fall, then this must include his mind. So, how far can we trust man's reasoning and what is the check against it?

References from page 31

AARDSMA, G. E. (1989). *Myths regarding radiocarbon dating.* Institute for Creation Research Impact Article, #189.

AARDSMA, G. E. (1994). *A search for radiocarbon in coal,* in: WALSH, R. E., editor. *Proceedings of the Third International Conference on Creationism.* Creation Science Fellowship, Pittsburgh. pp.1–8.

HASTINGS, R. J. (1987). *New observations on Paluxy tracks confirm their dinosaurian origin.* Journal of Geological Education, 35:4–15.

HASTINGS, R. J. (1995). *A tale of two teeth or the best of teeth, the worst of teeth.* Creation/Evolution, 15(1):1–14.

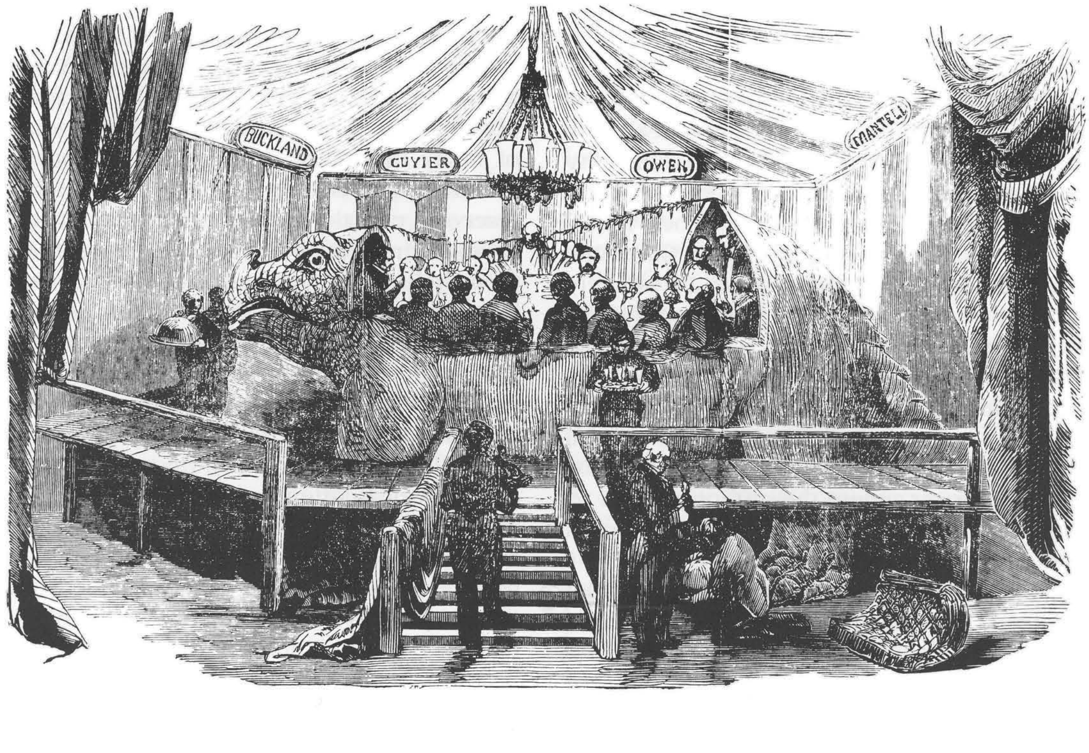
MILNE, D. H. and SCHAFERSMAN, S. D. (1983). *Dinosaur tracks, erosion marks and midnight chisel work (but no human footprints) in the Cretaceous limestone of the Paluxy River bed, Texas.* Journal of Geological Education, 31:111–123.

NEUFELD, B. (1975). *Dinosaur tracks and giant men.* Origins (Geoscience Research Institute), 2:64–76.

SNELLING, A. A. and RUSH, D. E. (1993). *Moon dust and the age of the solar system.* Creation Ex Nihilo Technical Journal, 7:2–42.

STOKES, W. L. (1986). *Alleged human footprint from Middle Cambrian strata, Millard County, Utah.* Journal of Geological Education, 34:187–190.

Michael Garton refers to dinosaur fever and fast food on page 14. Readers may be interested in to see (below) that a more leisurely Dinner in the Iguanodon was an attraction of the Great Exhibition of 1851. [Picture from the Illustrated London News, *1854]*



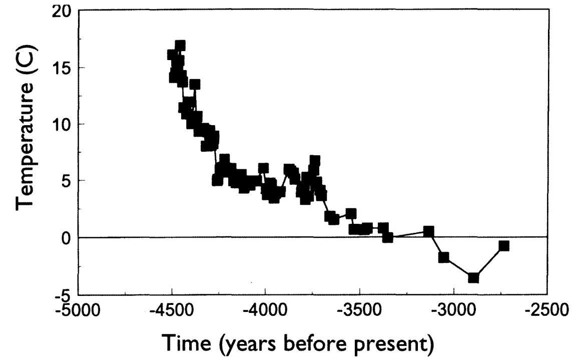
Queries and Comments

q: If chalk was deposited rapidly, it would cause a massive reduction in the level of carbon dioxide in the atmosphere and so in temperature. What is the evidence for this latter effect?

---

a: Certainly the rapid formation of the upper Cretaceous chalk following the Flood postulated by our model of earth history would cause a massive reduction in the CO_2 level and, consequent on this, a significant drop in temperature. These two effects are well recognized but the consequences in our Young Earth model need to be clarified. There is still research going on into this, but certain details are already apparent.

A study of the oxygen isotope ratio in benthic foraminifera confirms the temperature drop and this can be plotted against the time. The following figure presents the accepted data plotted on our model:



Polar Sea-floor Temperature vs. Creation Model Time

It is significant that this demonstrates a standard scientific (Kelvin) cooling curve and is not, therefore, unrealistic. The consequent question raised concerns the effect of this.

We believe that the inevitable and immediate effect of this was the Ice Age. Research at the moment does not enable us to fix dates precisely, but I think the above curve does give an estimate of the effect. My own inclination is to a slightly earlier time scale, but we await the results of on-going research. Vardiman derived the above curve on the basis of the Flood ending at the end of the Cretaceous. We believe the end of the Flood came earlier in the rock record.

Certainly this model does yield data consistent with meterological and geological observations, as shown by the meterologist, Michael Oard in the States.

q: It is generally claimed by creationists that there are no intermediate forms to be found in the fossil record. What about the lung fish as an intermediate in the fish to amphibian transition?

---

a: It has been pointed out that the lung fish has a number of features which are intermediate between these two groups and, therefore, demonstrates the possibility of an evolutionary process between them.

It appears that this is not proposed as an intermediate by evolutionists but, rather, is considered an irrelevant side-branch of evolution. There is no evidence consistent with the accepted phylogenetic trees to see the lung fish in this intermediate role.

The lung fish has fins, gills and an intestine with a spiral valve (like a fish) but lungs, heart and larval stage like an amphibian. However, as Dr. Michael Denton points out, while the former features are typical of an ordinary fish, the heart and circulatory system are similar to those found in most terrestrial vertebrates so 'the individual characteristics themselves are not in any realistic sense transitional between the two types,' *i.e.* the features are not transitional but perfectly formed. Denton points out how few are the examples, like the lung fish, that can be proposed as intermediates and even these show no true intermediacy of organs.

As with other examples, the modern lung fish are identical with those found in the Devonian (*ca.* 350 million years ago in the conventional time scale). They have not evolved, which is suprising, especially if they are to be seen as an intermediate. If they did not evolve into true amphibia, we should at least find their contemporaries in the fossil record that did so evolve. The environmental and climatic changes since that time provided the force needed to drive their evolution if such were to take place.

This can be illustrated by considering, for example, the hæmoglobin in man and the lung fish. The two lines are supposed to have diverged in Devonian times, with man's line having undergone profound changes through amphibian, amniotic and mammalian transformations. One can consider the changes implied to the heart, respiratory, blood, *etc.* systems. Yet, the lung fish has remained unchanged.

So, the lung fish seems to demonstrate the same features as, for example, the cœlocanth in terms of its history: a sudden appearance and a persistence without change during a period in which massive evolutionary changes are to be expected. Its specific features are all well adapted to its life history (and clearly account for its survival) and were there from the beginning.

JOURNAL ALERT

Due to the difficulties of keeping up to date with production, we regret that this publication has had to be discontinued, with a final 1997 double issue.

ORIGINS
• Journal of the Biblical Creation Society •

Origins is published twice a year by the
Biblical Creation Society

President	Professor Edgar Andrews *University of London*
Vice-Presidents	Ranald Macaulay *L'Abri*
	Pastor Stuart Olyott *Liverpool*
	The Reverend Geoffrey Thomas *Aberystwyth*
	Professor Verna Wright *University of Leeds*
	Professor Terry Hamblin *University of Southampton*
	Dr. David C. Watts *University of Manchester*

More information about the Society may be obtained from the Secretary

Editorial matter should be addressed to the Editor

Subscription enquiries should be addressed to the Administrative Officer

Biblical Creation Society
PO Box 22
Rugby Warwicks CV22 7SY

Telephone enquiries: (01788) 810633

Subscription Rates

Membership is open to all in agreement with the Aims and Doctrinal Basis of the Society. (Husband and wife join for a single fee. Reduced rates apply to undergraduates, missionaries and registered unemployed.)
In addition to Origins, members receive additional mailings and newsletters; they also assist in prayer and in the financial commitments of the Society, including the financial support of the Administrative Officers.

	Membership		Journal Only	
	Standard	Reduced	Standard	Reduced
U.K.	£12.00	£5.00	£5.50	£4.25
Europe	£13.00	£6.00	£6.00	£4.75
Outside Europe (surface mail)	£13.00	£6.00	£6.00	£4.75
Outside Europe (airmail)	£15.50	£8.50	£8.50	£7.25

Single Issue Price

The price of a single issue is £2.75 plus postage

ISSN 0953-2773

Printed by Inkon Printers Oldham Street Hyde Cheshire SK14 1LL Tel: 0161-368 3444